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INTERNATIONAL JOURNAL OF FILM
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SEPTEMBER 1982

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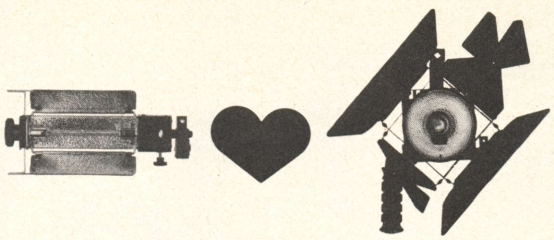

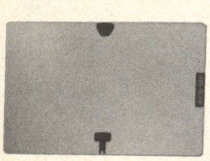

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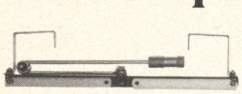

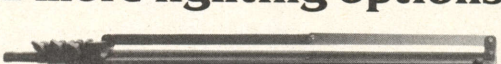

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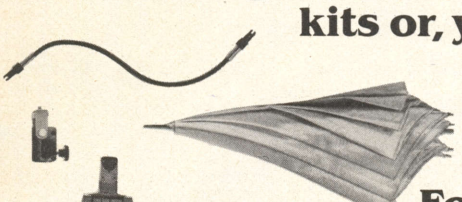

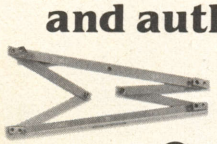

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ON THE COVER

Dolly Parton as Miss Mona assures all concerned that "there ain't nothin' dirty goin' on" at her establishment in a song from THE BEST LITTLE WHOREHOUSE IN TEXAS produced by Thomas L. Miller, Edward K. Milkis and Robert L. Boyett. Photo by Robbie Robinson.

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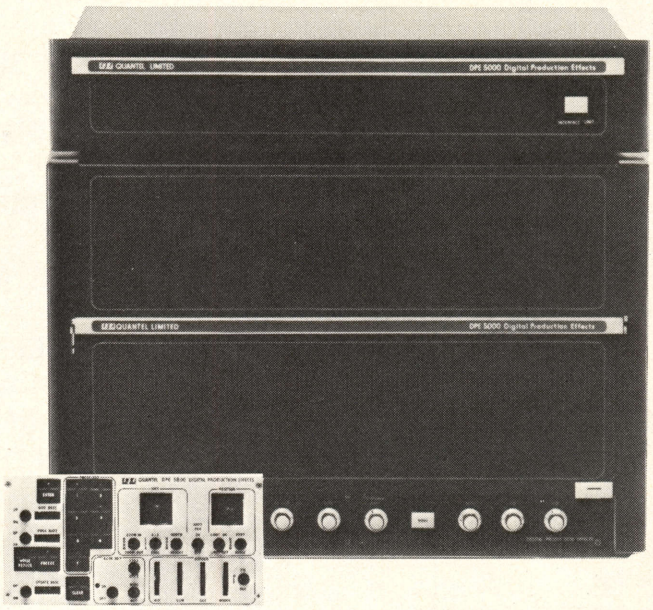

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FROM THE EDITOR

The genuine Bill Kroyer

The real Frank Serafine

Those of you who are fortunate enough to know Bill Kroyer or Frank Serafine may have been puzzled by the way working on TRON affected their looks. Rest assured that they were not digitized and garbled in the computer. They were simply the victims of some good old fashioned human error when we put their pictures into last month's issue.

We have been gratified by the response to the last two issues and to the proposal of a letters column. Please continue to let us know what you want from the magazine and to share your experiences with the rest of the readers. One thing we are trying to formulate is the best balance between special effects and conventional production techniques. Although there is a temptation to focus on big, expensive special effects movies, because they are so fascinating from a technical point of view, we do not want to do so at the expense of the other dimensions of film and video production. News, documentary, industrial, commercial and experimental production techniques are all just as worthy of coverage as well as dramatic productions which do not require special effects.

One area I am particularly interested in is low budget independent films, and we have several articles in the works on independent features. Another area I hope to explore in greater detail is the relationship between production technique and the overall emotional impact of a movie. As is fairly obvious from a number of movies in recent years, special effects alone can not carry a movie. Nor can the slickest possible photography and sound recording. If the human and emotional dimension is not there—in the form of either a good story or simply a strong point of view—then all the technique in the world is not going to redeem the film. At the same time, the emotional impact of a story can be dissipated if the technique with which it is told is not sufficiently polished. There is a point with film production where it is counterproductive to shoot a film if it can't be shot properly. This may vary according to the nature of the production, and it is just as silly to think that every film needs the resources of a multi-million dollar production as it is to think that LAWRENCE OF ARABIA could have been shot with a hand held 16mm camera.

Evaluating the level of production value required by a specific production is a complex judgment which often appears to be decided by default. We are hoping that AMERICAN CINEMATOGRAPHER can contribute to a discussion of the issues involved in such a decision in a way that will benefit film audiences and producers alike.

—RICHARD PATTERSON

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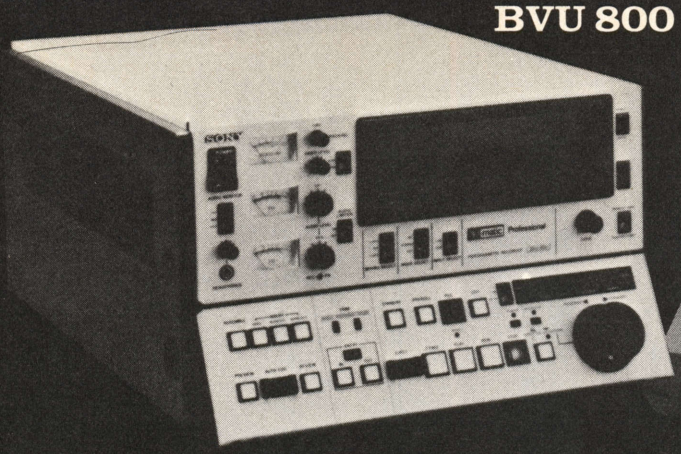

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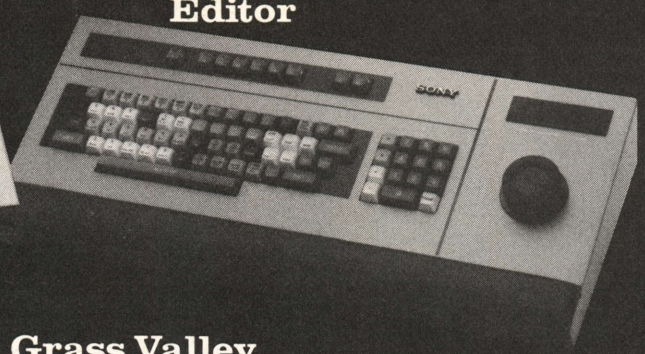

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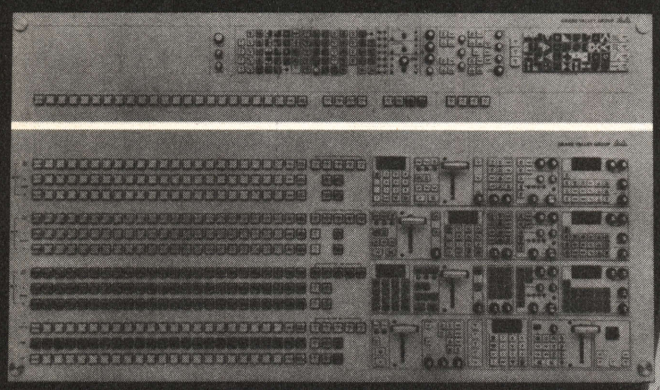

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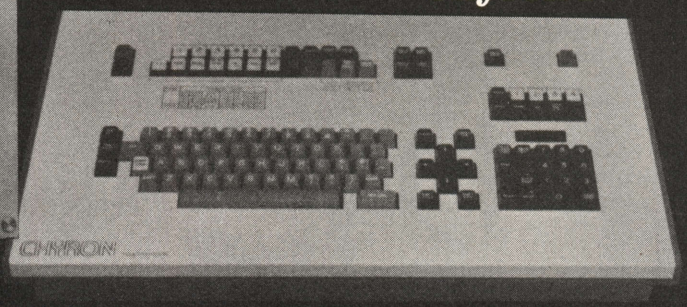

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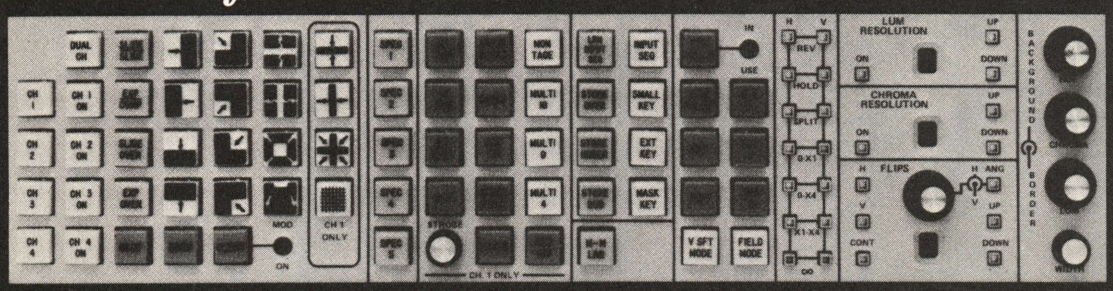

Richard Duke, editor

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LETTERS TO THE EDITOR

Japanese Water Colors

A hearty welcome to the new editorial team. Your first issue (July '82) was dynamite. As a producer who sometimes has to transcribe tape-recorded interviews into written form, I had to laugh at something on page 718, part of the excellent interview with Syd Mead about BLADE RUNNER. Syd is quoted as saying that a teacher he had in art school could do "quick tempura sketches." Immediately I saw this talented lady holding a long fork stuck into a fried shrimp. The word should be "tempera," no?

Hal Whipple
Portland, OR

George Turner, our artist-in-residence, has offered to do some illustrations in batter which we could then fry onto a page of Mr. Whipple's copy of the next issue, but for the time being we stand corrected. If you think that was bad see this month's editorial.

Exposing for Rear Projection

I recently had problems trying to shoot titles. The titles were lettered on glass and placed about two feet in front of a frosted acetate rear screen. The title glasses were lit and flagged so none of the light hit the screen. To set exposure, incident readings were taken at the glass and reflected readings at lens to measure the light from the rear screen. Although I checked the readings ten times, all the film (7247) was badly overexposed. The rear screen had a 35mm projector with well exposed location stills. Do you have any idea what might have happened?

Kevin C. Brechner
Pasadena, CA

Howard Anderson, ASC, replies that the background is probably overexposing the image because of the metering technique. It is very difficult to get an accurate exposure reading on a rear projection screen unless you use a spot meter which is right on line with the camera lens. The amount of light transmitted by the screen varies dramatically with the angle from which it is viewed, and an overall reflected light reading of the screen will result in overexposure. The problem is even more critical with front projection and as a result the tendency among professionals is to use an incident reading on the foreground and balance the background and foreground by eye.

The Old Mashed Potato Trick

In the near future I will be shooting several TV spots for a local dairy company. Using HMI is cost-prohibitive at this time, and I've already considered the old mashed potato trick. What other techniques can you recommend for making their products look smooth, rich and creamy without melting the ice cream?

David M. Waterman
Grand Forks, ND

We consulted with Jim Gillie who is a specialist in product cinematography and has encountered the same problem. He has several recommendations and as a result of our conversation agreed to furnish an article on product photography. For the time being, however, if your ice cream hasn't already melted he suggests the following:

1. Shoot in a meat locker or freezer. He reckons you could probably get the same result in North Dakota by waiting a few months and shooting outside.

2. Have plenty of ice cream ready. Use mashed potatoes for the stand-in to set the shot and have the ice cream ready in the freezer. Unfortunately as soon as you take the ice cream out of the freezer it is going to start to melt,

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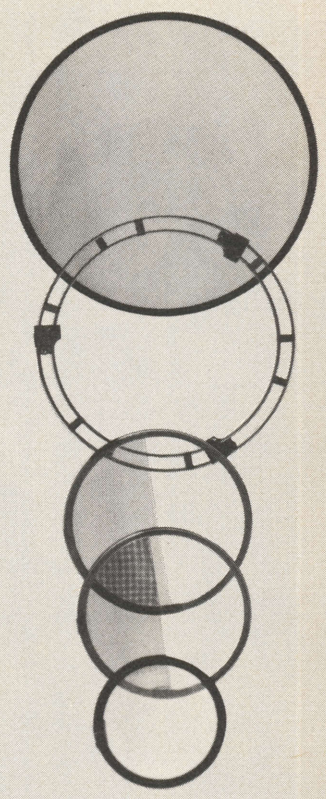

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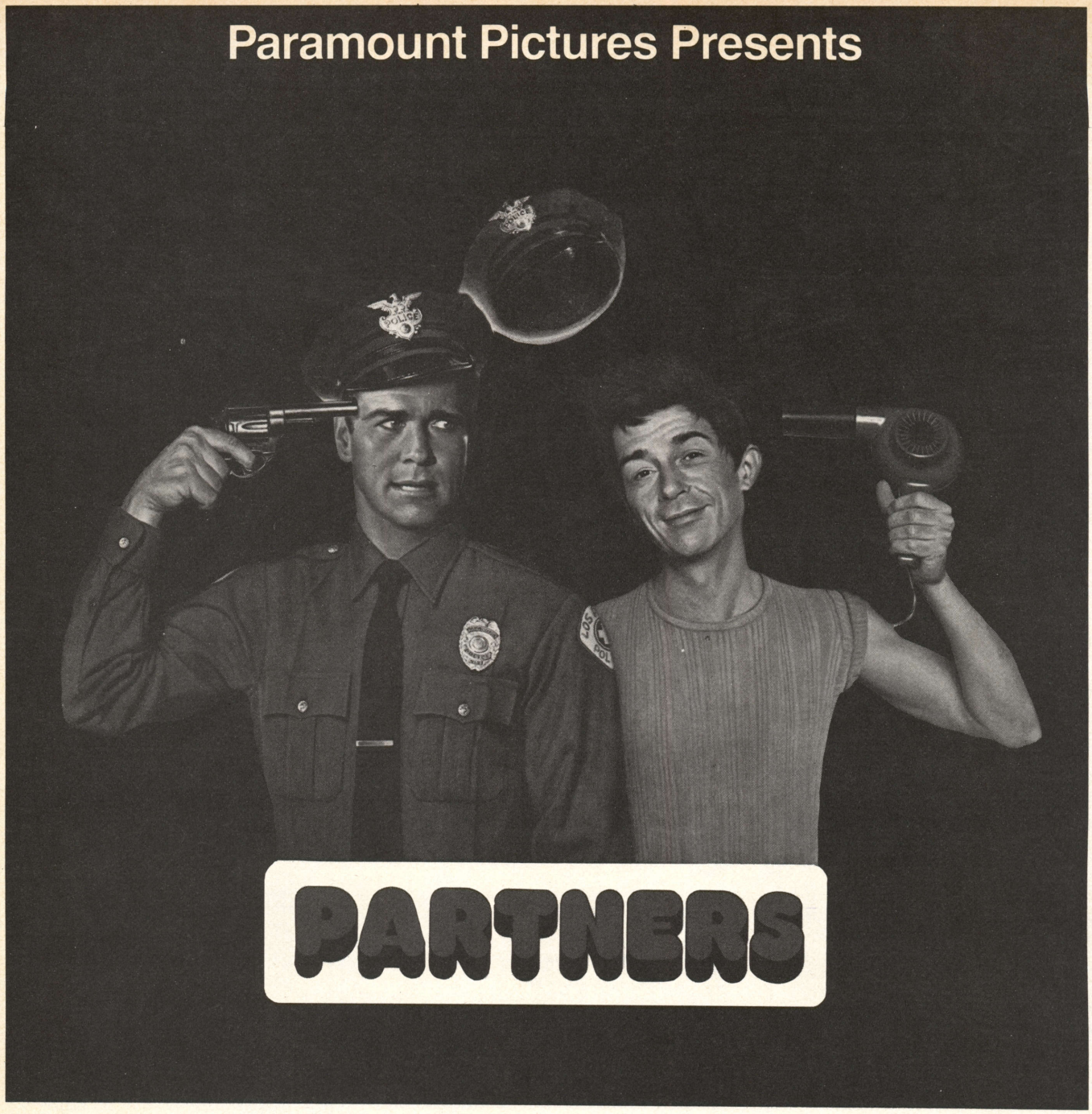

Let's hear it for the cinematographer-Victor Kemper A.S.C.

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but with good timing and a little luck you can get that to work for you. There is a moment when the ice cream just starts to melt where the texture of the surface is ideal for photographing it.

3. Use a fan to keep the heat of the lights away from the ice cream. You can also try spraying the air above the ice cream with freon to keep it cool. If you spray too close to the ice cream you will get a frost on the ice cream which kills the color, but Jim has had good luck spraying above the ice cream.

4. Put the lights on a dimmer which you can control at the camera eyepiece so that you can bring them up only when you are ready to shoot. Jim does not even recommend HMI lights for this kind of work. He prefers scoop lights or "bashers" on a dimmer. All you need is 20 or 30 seconds of good footage so if you have plenty of ice cream set up waiting in the freezer, you should be able to get it as it melts.

Historical Perspective

George Turner's historical articles forecast and the excellent article on "The Phantom Set" is most welcomed. A future article on the making of LAST DAYS OF POMPEII (RKO 1935) showing the contribution of Willis O'Brien would be appreciated.

A suggestion, in the form of a request, is offered. Could an exception to the usual practice be made by publishing George Turner's articles complete in one section of the magazine, instead of a continuing article sandwiched between advertisements on numerous pages?

Also, what is the possibility of the mailing label being applied to the back of the magazine instead of the cover?

Michael Santoro
Chino, CA

Something on LAST DAYS OF POMPEII may be feasible. Printing the historical articles in a separate section is not at the moment, but we have begun thinking about compiling them into a special reprint or book if we feel there is sufficient interest. Your mailing label should in fact be put on the back of the magazine depending on the nature of the ad on the back.

Heartfelt congratulations on the articles about "classic" films. I hope this series will be come a regular part of the magazine. Perhaps it may save some of your younger readers from having to reinvent the business. We all have our pet topics, but one I'd like to suggest is an in depth study of the work of one of the special-effects Greats: John Fulton. Topic for an entire article would be his work on THE TEN COMMANDMENTS.

David Bowen
Monrovia, CA

Photo Credits

I enjoyed your BLADE RUNNER issue, especially the excellent cover photograph by Steve Vaughn. Sadly your magazine listed no cover photo credit, as usual. This seems to be the policy as in the past stills used to illustrate your fine magazine have consistently gone uncredited. Although I realize the purpose of your magazine is to glorify the art of the cinematographer, how about some credit where credit is due? Unit still photographers provide your magazine with first class art. How about some "equal time?"

Bruce Birmelin
Tolucca Lake, CA

Our apologies to Mr. Vaughn. Some readers may have noticed that we have begun giving photo credits where we can and we shall try to do so even more. Quite often we receive photos without a photo credit.

Understanding Video

In the March '82 issue you announced that it was time to embrace the video issue. For the first time we ran off and registered for video classes thnking that we must now do this since the bible of the business has finally recognized the "other" media. We hoped that, as promised, the magazine would "emphasize the fundamentals" but instead we were blasted with diode vs. triode, ⅔" vs. 1¼", 30 MHz, adjusting registration, etc., etc., etc., with definitions way beyond my understanding and I'm a 4.0 student! But I love the magazine so please keep it coming!

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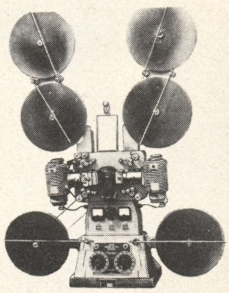

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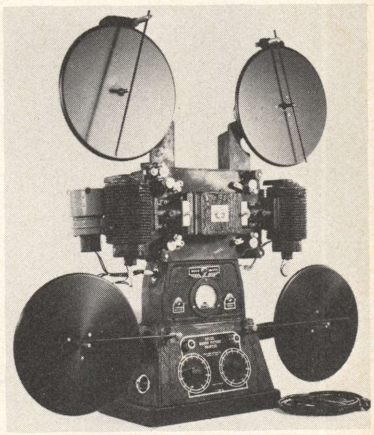

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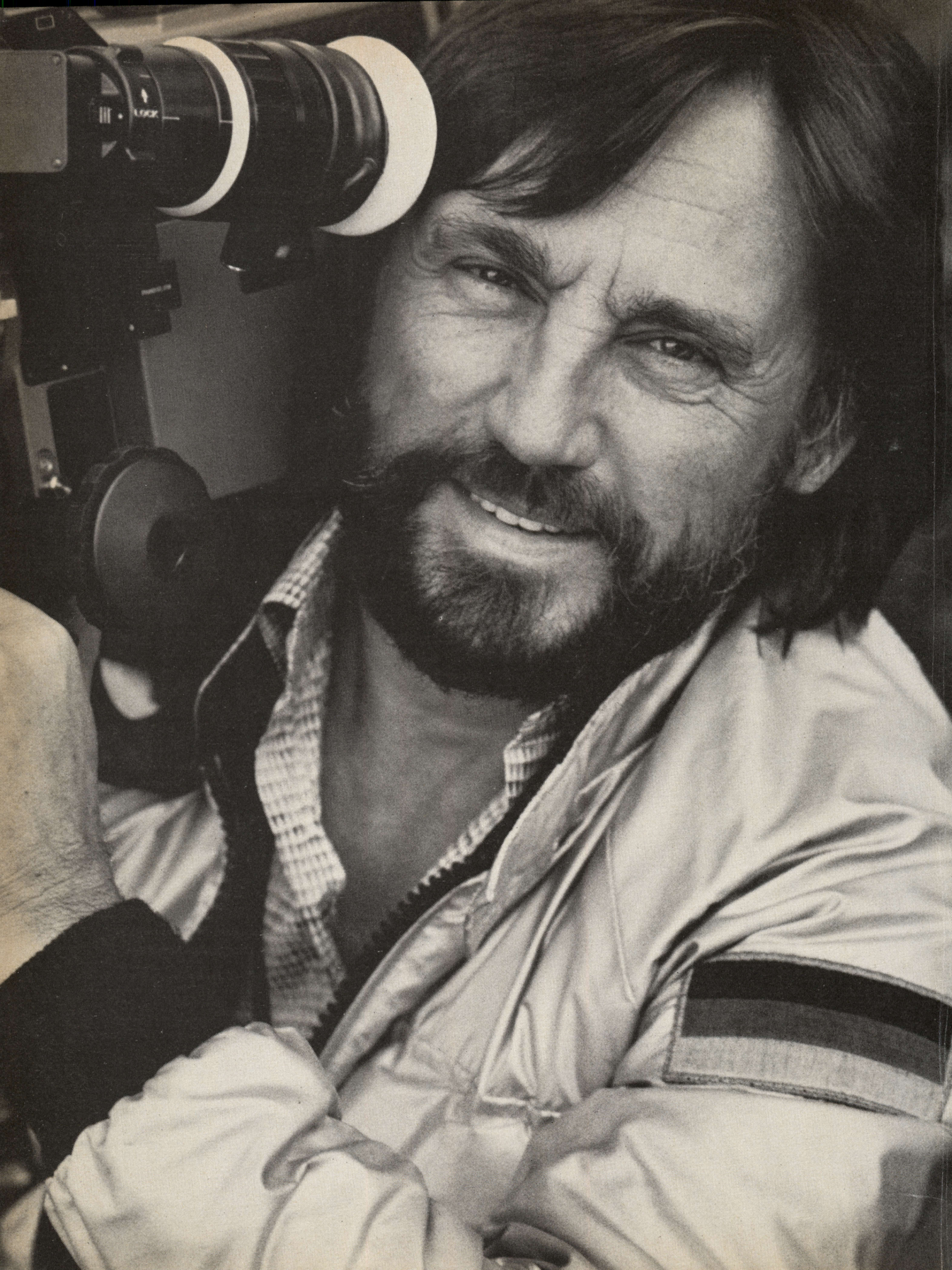

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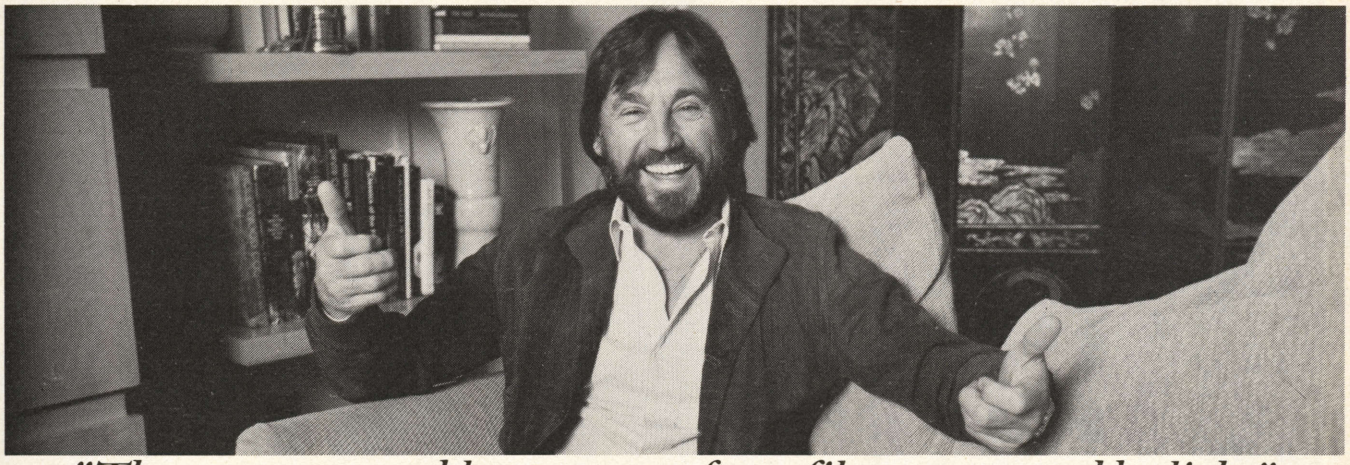

"The most memorable moments of any film are created by light."

Born in Hungary, Vilmos Zsigmond has become in the past decade one of America's premier cinematographers. He won the Academy Award for Close Encounters of the Third Kind, *and an Academy Award nomination as well as the British Academy Award for* The Deer Hunter. *His work on* The Long Goodbye *earned the National Society of Film Critics' Award for Best Cinematography of the Year. His latest film,* Table for Five, *is being shot on location on the Mediterranean.*

"My style has changed through the years because technology has changed. We now have faster and better films, and lighting equipment is getting smaller and better. Today you can shoot a film that looks as if the cinematographer didn't use any supplemental light at all. It's a very natural look. And audiences today are much more educated, to the point that, when they see bad lighting, they notice it right away. So we're really forced to make a film look and feel as natural as possible.

"I try to light so that it feels as if it comes from natural sources. That's why I like to have windows in my shots—windows or candles or lamps. Those are my true light sources. Studying the Old Masters, Rembrandt, Vermeer, De la Tour, I found that they painted their best works relying on light effects coming from realistic sources. They even selected their subjects because they loved the light and the people. They were very selective and improved upon nature. They simplified and eliminated multiple shadows to concentrate on the dramatic. That is what a cinematographer does: improves on nature.

"It was easier to shoot in black-and-white. All you had to worry about was light and shadow, contrast and abstract forms. I can do anything in color that I can do in black-and-white—and more. And if you want a black-and-white effect, well, you can do that, too. Thinking of paintings: Can you honestly remember any great painting that is black-and-white?

"As a cinematographer, I often get too much credit for the look of a film—like the red, white and blue scheme of DePalma's *Blow Out,* a film I worked on. A lot of these things are worked out in advance, by the art director, the director, the writer. After all, they spend up to a year preparing a picture before I come on board.

"I like a soft look, and there are many ways to get it. On *Close Encounters of the Third Kind,* all the effects you remember were created by light. In fact, the most memorable moments of any film are created by light. On *McCabe and Mrs. Miller,* I used lots of diffusion filters, and forced the film, and lots of flashing of the negative, which desaturated the colors and made the black sort of dark gray. The whole film had an interesting period look. On *Heaven's Gate,* we didn't filter the camera at all—simply used the natural softness of dust outside and smoke inside. And we flashed the print itself, print by print.

"I like the look of the new Eastman color high-speed negative film 5293. It will bring a new look to the industry. It's softer and looks good. Its terrific sensitivity will enable us to shoot under difficult conditions we only dreamed of. Actually, I go after texture and light primarily. I plan to use 5293 for all of my next feature, and not just the low-light segments. There's no problem with overexposure with it. It has a wider latitude.

"I've shot commercials, too—both film and tape. The film look is a lot better. You can't push videotape, either. Videotape can be complicated: In studio it is fine, but on location things break down in a way that doesn't happen with a camera. A film camera is actually very simple. Videotape is just not good enough yet. There's not sufficient definition to project on a big screen. It will probably be decades before they come up with a tape that matches today's image quality of film."

If you would like to receive our monthly publication about filmmakers, KODAK Professional Forum, *write Eastman Kodak Company, Dept. 640, 343 State Street, Rochester, New York 14650.*

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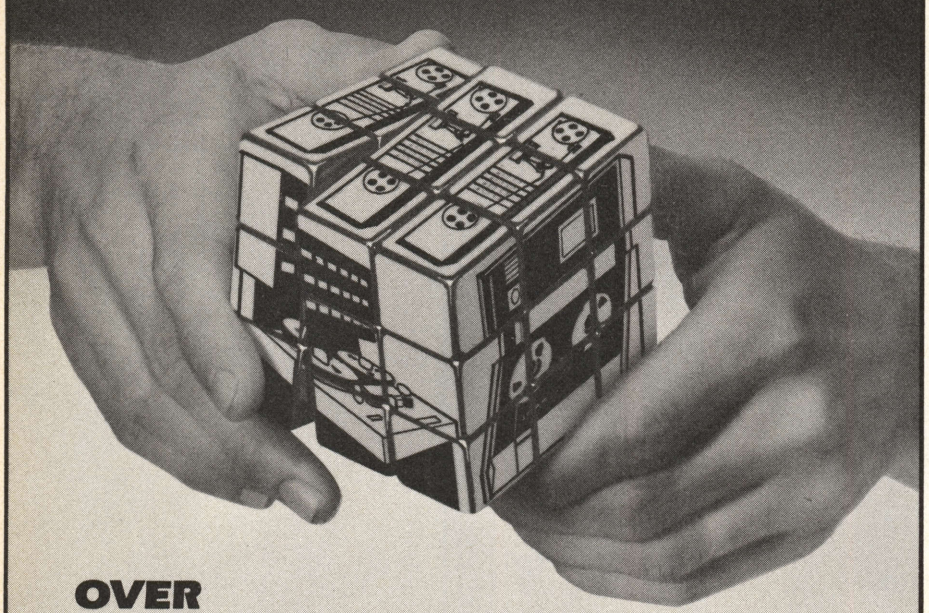

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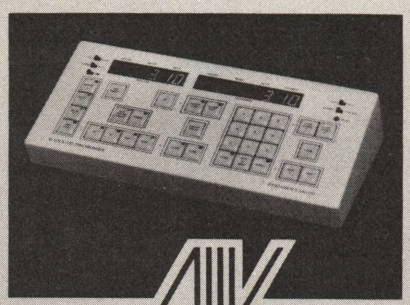

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THE BOOKSHELF

By GEORGE L. GEORGE

ASPECTS OF THE CRAFT

Diligently researched and expertly edited by Alain Silver and Elizabeth Ward, FILM NOIR deals with some 300 American movies characterized by a somber and cynical tone, brooding anti-heroes, generally in low-key photography and with expressionistic camera angles. From Sternberg's *Underworld* (1927) to Scorsese's *Taxi* (1976), the style and method of a particularly indigenous genre are covered in this engrossing and entertaining reference work (Overlook/Viking $25/12.95).

An exciting behind-the-scenes look at the making of the collection of $40-million filmusical, ANNIE ON CAMERA assembles a stunning collection of unposed stills by nine gifted photographers, catching moments of intense work or casual reflection, and linked by Anne Hoene Hoy's informative commentary (Abbeville $29.95/17.50).

Sixty years of Hollywood pulchritude are packaged in THE IMAGE MAKERS, a lavish, king-size book designed by Richard Lawton with text by Paul Trent. It offers a dazzling array of over 300 color and black and white film star portraits by outstanding photographers, an eloquent visual comment on the changing standards of beauty and that elusive magic we call glamour (Harmony/Crown $12.95).

The history of Mascot Pictures, an independent Hollywood studio active between 1927 and 1935, is told by Jon Tuska in THE VANISHING LEGION. This engaging chronicle presents Nat Levine, Mascot's venturesome founder, and assesses every Mascot serial and feature, memorable prototypes of the B movie (McFarland, Box 611, Jefferson, NC 28640; $17.95 + $1.25 postage).

The creative process inherent to the collaborative nature of Hollywood film making is searchingly explored by Rudy Behlmer in AMERICA'S FAVORITE MOVIES: BEHIND THE SCENES. Dealing with 15 time-honored favorites, including *Casablanca*, *The Grapes of Wrath*, *All About Eve*, Behl-

mer interviewed key people involved and perused available production documents to fashion a uniquely informative and engrossing book (Ungar $19.95/11.95).

WRITING FOR THE SCREEN

An extensive appraisal of the McCarthy witchhunt era appears in a well-documented and objective study by Nancy Lynn Schwartz, THE HOLLYWOOD WRITERS' WAR. The struggle to establish the Screen Writers Guild, the combined opposition to it by studios, press and government, the active role of liberals and Communists are discussed in in-depth interviews with writers, directors and producers in a riveting narrative that recounts the turmoil of the times (Knopf $17.95).

Screenwriter Lester Cole, one of the unbowed Hollywood Ten, offers a vivid personal memoir of those turbulent days in HOLLYWOOD RED. Not one to forgive and forget, he vigorously asserts the correctness of his views, citing history for his justification, as he details ideological quarrels, judicial persecution and intimate tragedies that left their mark on so many movie industry people (Ramparts Press, Palo Alto, CA 94308; $12.95).

The screenplay of Nicholas Ray's last film, *Lightning over Water*, co-directed with Wim Wenders, appears in an elegant, well-illustrated large format book. Carrying the original German dialogue and its translation, NICK'S FILM: LIGHTNING OVER WATER is a dramatic document of the last weeks in the life of the controversial director, defiantly creative until the end (Blue Angel, Box 137, Charlottesville, VA 22902; $16.90 postpaid).

Reviews by insightful film critic William S. Pechter are assembled in MOVIES PLUS ONE, a subtle and enjoyable second look at selective samples of screen entertainment, knowledgeably evaluating the individual contributions of directors, cinematographers and writers (Horizon $14.95).

A comprehensive compilation of English language print material dealing with film, television, radio, and the theatre, ANNOTATED BIBLIOGRAPHY OF NEW PUBLICATIONS IN THE PERFORMING ARTS is a quarterly indispensable to scholars, librarians and many buffs. Expertly edited by Ralph Newman Schoolcraft, its latest issue carries descriptions of all such publications issued during the last quarter of 1981 (Drama Books, 723 7th Ave., NYC 10019; $1 per issue, $2.50/year).

In SCREENPLAY SALES DIRECTORY, writers will find valuable and occasionally eccentric advice for selling their film/tv scripts, plus interviews with major studio story editors, and names and addresses of agents, producers, directors and performers (Joshua Publications, 8033 Sunset Blvd., Suite 306, Hollywood, CA 90046; $12.45 postpaid).

INTERNATIONAL CINEMA

Donald Richie's masterful account, THE JAPANESE MOVIE, covers the full span of Japan's contribution to world cinema. This revised edition of a classical book, a superb large format volume handsomely illustrated, discusses the evolving concepts that guided Japanese filmmakers in their esthetic grasp of the film medium and their sensitive adaptation of its characteristics to the traditional culture of the country (Kodansha $26).

Focusing on established and rising Italian directors, R. T. Whitcombe's THE NEW ITALIAN CINEMA provides an analytical study of its mercurial qualities displayed during the last two decades, from Antonioni's *L'Avventura* (1960) to Bertolucci's *La Luna* (1979). The rich variety of styles and genres, the startling innovations and the renascent neo-realism, all attest to Italy's mastery of her artistic resources (Oxford U. Press $19.95).

Charles Barr's affectionate and detailed history of Britain's film production in the 40s and 50s, EALING STUDIOS records the creative atmosphere and team spirit, inspired by producer Michael Balcon's leadership, that spawned dozens of movies of exceptional interest and originality (Overlook/Viking $10.95).

In the revised and enlarged edition of THE MOVIES GROW UP, Charles Champlin, the esteemed critic of the L.A. Times, traces the path of film progress from the 40s, when movies peaked in power, to the 80s, when they gathered new strength after barely surviving the body blows of economics and television (Ohio U. Press $25.95/12.95). ■

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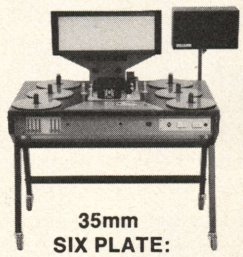

35mm
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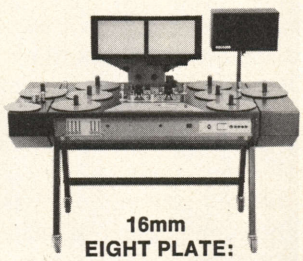
Academy, 1.85:1, Anamorphic.



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CINEMA WORKSHOP

By ANTON WILSON

EQUIPMENT CASES

The cost of video and film equipment today is astronomical. Ten years ago a nice Arri S outfit went for $6,000 or so. Today a 1″ EFP outfit goes for over $100,000. So what else is new? The point is, that kind of an investment in equipment should raise some very serious thoughts about protection. Protection can mean insurance and of course anyone in his right mind would have an all risk policy for his gear. But an insurance policy isn't going to help you when you unpack your camera on location and find that it looks like a Toyota that has collided with a Mack truck on the San Diego Freeway. The kind of insurance that protects this kind of exigency is a proper shipping case.

Most video gear is very rugged when treated properly. Proper treatment, however, does not include a 4 foot drop off an airline conveyor belt. A close inspection of ENG/EFP cameras and recorders will reveal very lightweight thin section frames, usually die cast aluminum/magnesium or stamped sheet aluminum. The outer cases are almost always thin sheet aluminum, less than .040″ thick in some cases. Lastly, in their zeal for compactness, the manufacturers package the electronics into these thin cases much like Brooke Shields fits her Calvin Kleins. In many instances the circuit boards practically touch the outer cases requiring the inside of the case to be plastic insulated. It should be obvious that any impact to or deformation of the outer case could cause havoc inside.

A Thermodyne high density polyethylene shipping container. This type of case is favored by the video industry for its combination of lightweight and strong protection.

Despite the concept of video as the "Electronic Medium," the VTR is very significantly a mechanical device as is the optical portion of the camera. The VTR has more guides, rollers and critical mechanical alignments than any film camera and is far more delicate. Here too an impact or jolt could upset precise calibrations and impair performance.

So now you have this very expensive vulnerable piece of equipment that you have to turn over to the teamsters and airlines. Lots of luck. The odds for survival, however, can be greatly increased by using properly designed shipping cases. There are two key phrases here; "properly designed" and "shipping." Many cameras come with a "carrying" case not a "shipping" case. There is a world of difference. The carrying case is usually quite compact, constructed out of aluminum or plastic with hard partitions inside to hold the equipment and accessories. These cases are reminiscent of those used for musical instruments. While they may look more rugged than the cases for guitars or violins, they most assuredly fall into this same category. These type cases offer no impact absorption whatsoever and are only meant for hand carrying or storage.

A shipping case, on the other hand, is designed like a crash helmet, performing two important functions. The outer shell is designed to spread an impact over a large area thus dispersing the energy so no one point receives a critical amount. Secondly, the inner material must absorb this energy before it reaches the equipment. This is similar to the pictures of automobile crash tests where, upon hitting a wall head on, the front of the car from bumper to windshield looks like an accordian yet the passenger compartment is unscathed.

In this analogy, the foam inside the case performs the energy absorption function of the front half of the car. Two things are important here. The foam must be the proper density for the piece of equipment and it must have sufficient space to compress. If the foam is top light, it will compress too easily and offer no protection. If the foam is too dense, it will transmit the shock directly to the equipment. Likewise, the foam must be of sufficient thickness to absorb a large impact. The amount of energy that the foam can absorb is directly proportional to its thickness.

When choosing a case, check the density of the foam. For a typical piece of video equipment, the foam should be of a fairly high density. It should not feel like a foam rubber pillow, yet it must have some "give." A 4 lb. density is typical for ENG/EFP cases. There should be a minimum of 2″ of foam on all sides, the top and the bottom. Heavier or more delicate equipment should have 2½″ to 3″ of foam. This 2″ minimum includes all appendages. It does no good to have 3″ of foam around a camera and then have a cut-out for the viewfinder that comes within 1″ of the outer case. Lastly, there must also be a 2″ minimum between components within the same case. Many times damage is caused by two heavier items smashing together inside the case due to insufficient cushioning between components.

The outer case construction is equally important. Pictured in Figure #1 is a Thermodyne case which is typical of the well designed case favored by the video industry. The outer case is high density polyethylene which has excellent impact dis-

Continued on Page 943

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TALKING TECHNICALLY

By DAVID W. SAMUELSON

It seems that the more sophisticated cameras become the less can be done to rectify faults which may develop in the field. There was a day when if a camera broke down it could almost always be put right even without having to have a trained camera engineer on the crew or having to send the camera back to base. I can remember a time when I was doing some air-to-air filming alongside a documentary crew who suffered a spring breaking in their clockwork Newman Sinclair camera and without coming down to land the cameraman dived into his accessory case, pulled out a spare spring together with a few tools and fitted the replacement there and then.

He filmed on for a short while when the other spring broke and this too he replaced. His only problem was cleaning his hands of a double layer of graphite.

On-location repairs of such magnitude couldn't happen today. It is not even always easy to get into the inside of the electronic compartments of some cameras to change a fuse.

While it is true that electronic circuits contain no moving parts to go wrong, so far as I am concerned the electronic circuit you can test and it works and you lay down your life that it will work in five minute's time hasn't yet been invented—if for no other reason than that someone will find a way to feed it with too many volts or a.c. instead of d.c. etc.

To be fair to the modern generation of cameramen, so much damage can be done by the misapplication of a soldering iron that only that which can be repaired by the simple course of plugging-in a spare should even be contemplated. This limits the possibilities dramatically.

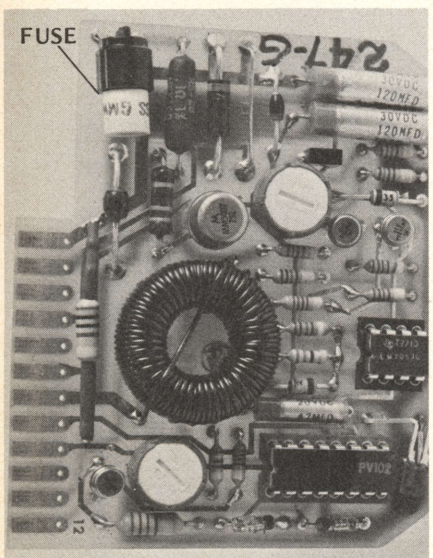
The single item with the greatest propensity for going down in the field is the battery. I speak from the heart when I say I don't know how to ensure that a nickel cadmium battery will never ever fail to deliver the goods no matter. I suspect that very often the problem is over enthusiastic charging by over keen camera assistants at over frequent intervals between too little usage and very often the cure to this is to deeply discharge the battery to 1 volt per cell and then fully recharge it several times in quick succession until it has been taught a lesson.

For sure, if a camera fails to run, the first action is to change the battery and if it still fails, change the battery again. When I was a cameraman I always operated on the premise that even if I only crossed the road I always took at least one spare battery with me. I am told by my friends who now use ENG cameras that the number of spare batteries that should be within easy reach has increased dramatically. They eat them I'm told.

If that's not the cause then change the battery-to-camera lead. Again, when I was a newsreel cameraman and covering an important event that could not be repeated I always used to have standing by a spare battery with a spare lead already plugged in. I've always been a real pessimist in these matters.

The problem with camera to battery cables is that they consist of many strands of fine wire which with the passing of time are liable to fray and rupture at the points close to the plugs at either end where they are flexed most sharply and when they are tested, as they always are when a camera is being prepared, it may be that only one strand is intact and yet the camera will run as if the cable was 100% efficient. It's sod's law that that last strand will fray apart at the first possible inconvenient moment. Short of X-raying every cable every day there is no way of telling if disaster is lurking around the corner.

The next thing to look for is a blown fuse that may either be in the battery unit or the camera itself. Assuming that one has eliminated the possibility of the former by changing the battery the next thing to know in advance is if the camera you are about to use incorporates a fuse or fuses, where it or they are located and if you feel it or they might fail, to have at least two



Typical position of fuse on Panavision Golden Panaflex power board. Older model Panaflex cameras which have not been updated have no fuse at all and in some instances the fuse may be located elsewhere on the power board than illustrated

The fuses of some of the most popular cameras are located as follows:

Aaton 7:	Cartridge fuse on battery panel
7 LTR:	PBX fuse on battery panel
Arriflex 16BL:	Pico fuse on circuit board inside of back panel
16M:	None
16St:	None
16SR:	On electronics panel behind plexiglass window (two spare fuses are usually also located there).
Arriflex 35II:	Some motors have cartridge fuses
35III:	One behind plexiglass panel on top of camera together with one spare and another inside back of camera
35BL I&II:	One on side of camera and another inside electronics compartment
35BL III:	One behind plexiglass panel at rear of camera together with a spare. Another inside electronics compartment.
Cinema Products CP16:	One fuse either in the Crystasound amplifier or inside the auxilliary side cover at the back of the battery slide. A fuse is fitted to each NC-4 battery pack which can only be changed at the factory.
Eclair ACL:	None
NPR:	Aaton, Beala and Perfectone crystal motors all have cartridge fuses, Perfectone governor controlled motor has a wired fuse.
Mitchell S35 Mk. II:	None
Mitchell NC/BNC/BNCR:	None
Panavision Panaflex:	Earlier models had none, Golden models have one fuse on the power board
PSR:	None
Panastar:	One fuse on top of inside camera body.

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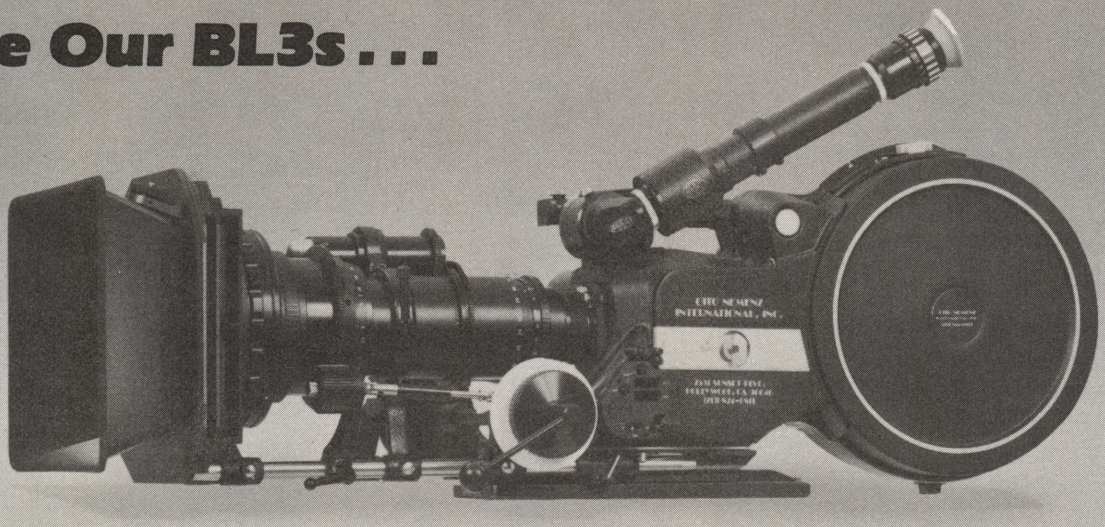

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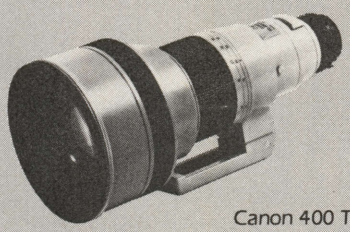

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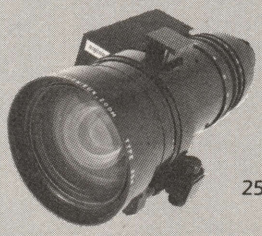

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spares of the correct size and amperage ready to hand.

I say if the fuse is likely to go because some fuses are as heavy as nails and never go (your friendly camera engineer will advise you on which might and which will never go) and I say to have two fuses to hand because if a fuse goes the first thing you do is to replace it and try again. If the cause of the failure was a short circuit which is still there your first spare will also fuse. Then is the time to find the cause and rectify it before committing the other spare.

Certain cameras, most notably the Arriflex 16M and 16St, certain 35II's with special motors and all Mitchells and Panavision cameras have film operated trip switches which may be the cause of a camera not running.

The next possibility is that the camera motor may have burned out and on some cameras (Aaton, Arri 16BL, 16St, 35IIC, Eclair ACL & NPR and all Mitchells) it is a simple job to try another motor if you happen to have one handy.

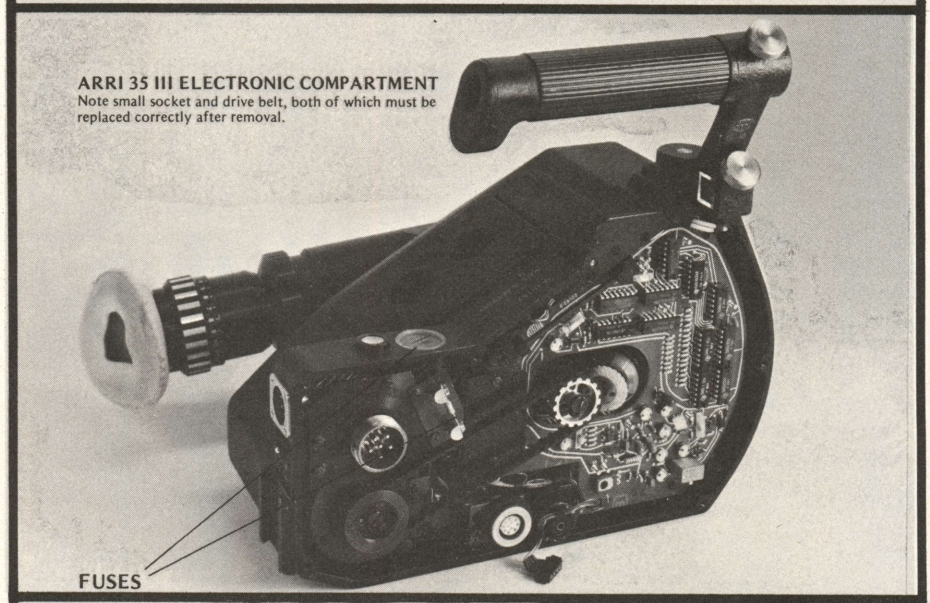
Equipment suppliers do not relish the thought of cameramen who are not trained in the crafts of camera servicing taking the back covers off Arri 35BL's to change the fuses because if they are not put back exactly right the cameras will become noisy.

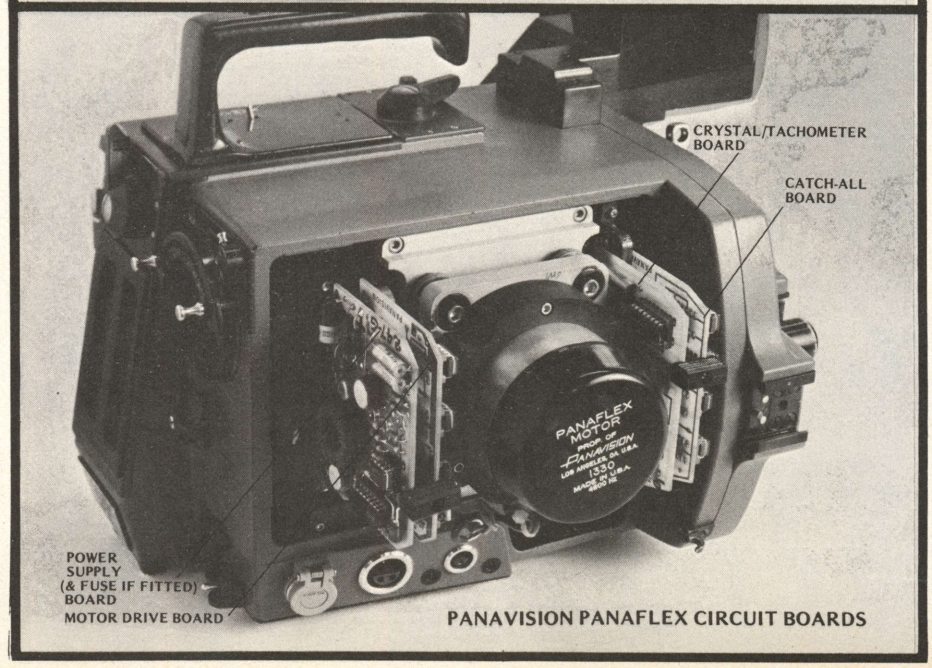
The next thing to contemplate is the awful possibility that some tiny, almost inconspicuous and probably quite inexpensive electronic component has failed which may well bring the entire film production to a halt until a whole replacement camera, no less, has been flown out at great expense half way round the world. It does happen and production companies should insure against it and any consequential losses.

The insides of modern cameras are a veritable melange of chips and ICs and transistors and other components all finely soldered together. It takes a very fine soldering iron held in a hand with a delicate touch and controlled by a brain that knows what it's doing to do anything about it.

The electronics of Arri's 35III's and 35BL's are no-go areas: not for touching by the uninitiated under any circumstances. For instance, on the Arri 35 III it is necessary to unscrew a small four-way socket from the back cover in order to remove the cover and if care is not taken this can be replaced the wrong way round and then to hinge out the circuit boards it

Continued on Page 944





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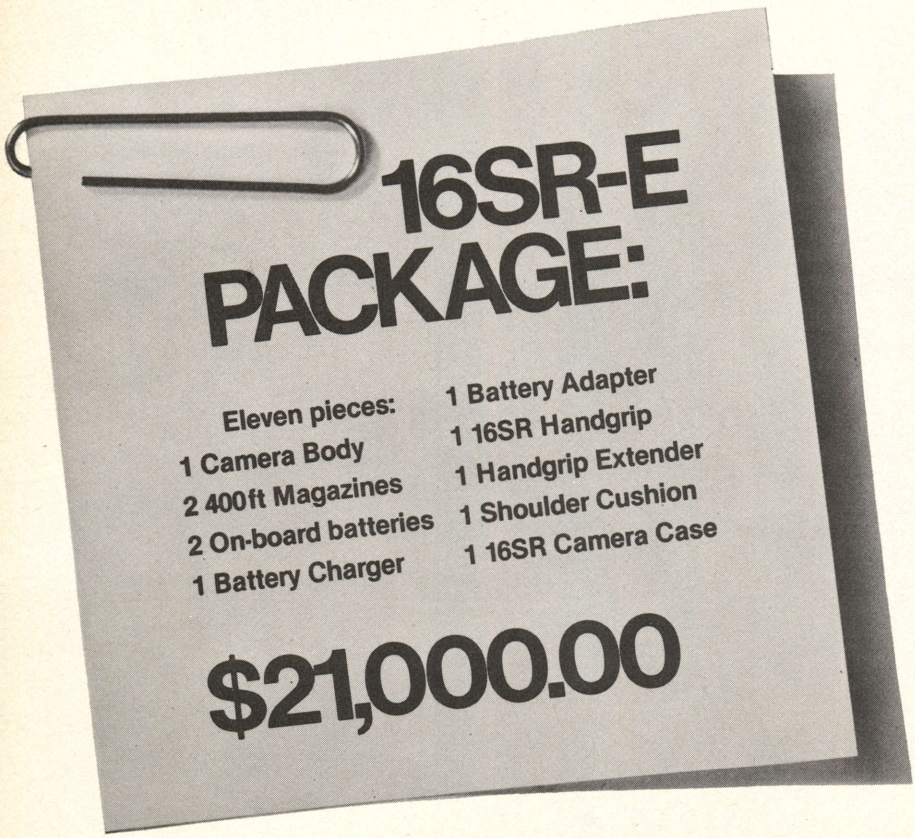

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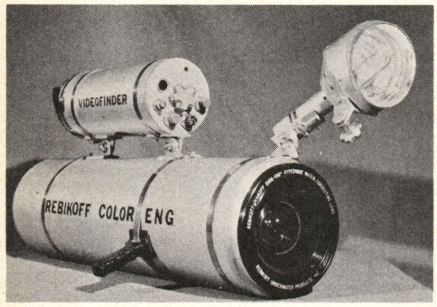


Tri-Saticon ⅔" tubes are standard. Scan is either U.S./NTSC 525/60 FPS or PAL 625/50 FPS. Resolution at center is: horizontal 500 TV lines (G Channel); vertical 350 lines.

All the underwater naval type 16mm high-speed REBIKOFF® DR 58 CINEMARINE, DR 584 35mm pulse camera, DR 8250 PROMARINE 250 frame 35mm still camera, and the REBIKOFF® QUARZFLOOD™, can be added in a cluster for all cine and photo permanent record requirements.

For further information contact: Rebikoff Underwater Products, Inc., 3060 S.W. 4th Avenue, Ft. Lauderdale, FL 33315. (305) 522-5572.

GSMO 16mm CASSETTE LOAD CAMERA

Cinema Products Corporation announces the immediate availability of the "new generation" GSMO 16mm cassette load production camera which now incorporates several significant design improvements to make it more versatile than ever.

The "new generation" GSMO is the only professional 16mm production camera which also offers a 100 ft. (30m) magazine. The result is the lightest, most compact camera package available on the market today. Total camera weight with the 100 ft. magazine (less lens and film) is less than 8 lbs.

"New generation" GSMO cassette-load magazines—the ultra compact 100′ (30m) magazine as well as the standard 400′ (120m) magazine—are made of extremely rugged, high-impact carbon fiber materials.

The electronics in the GSMO represent the most extensive use of advanced microcircuitry in a 16mm camera, with hybrid chips employed for most operating functions. The GSMO features selectable crystal-derived speeds from 12 fps to 64 fps with principal crystal sync speeds of 24 and 25 fps. The "new generation" GSMO also features an optional 30 fps crystal sync speed for direct frame-to-frame transfer to videotape, making it ideal for shooting TV commercials and documentaries.

The "new generation" GSMO also permits "electronic inching." Depressing the battery test button before the camera is turned off will stop the mirror shutter in an open position so that the aperture can be easily viewed.

Another "new generation" feature is the new GSMO viewfinder, which is adjustable to accommodate 32 erect viewing positions.

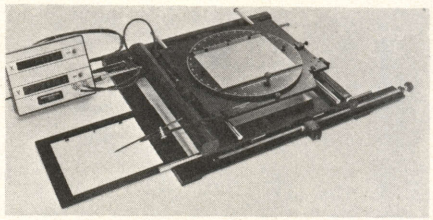
In addition, Cinema Products Corporation guarantees the sound level of its remarkably quiet "new generation" GSMO not to exceed 28 dBA one meter from the film plane while pulling film.

For further information, please contact: Cinema Products Corp., 2037 Granville Avenue, Los Angeles, CA 90025. (213) 478-0711 or (213) 477-1971.

SPECIAL EFFECTS COMPOUND

GrafTek® has introduced a new 12-field compound designed for use by motion picture, television and slide production houses in the generation of special effects graphics.

The GrafTek 12-field compound differs from previous models, in that it uses an electronic scanning device, designed to measure movement to 1/10,000th of an inch, thereby eliminating problems associated with rotation counting methods in use with other systems currently on the market.



The GrafTek is designed for use with full 12-field negatives or animation cels. The pin bars are offered in either Acme or Oxberry, with 12- or 16-field configurations. The system comes complete with an adapter plate allowing the user to work with small format film carriers, such as those designed for slide production by Marron Carrel, Forox and Mangum-Sickles Industries.

The compound has a full North-South movement of 18 inches and an East-West movement of 24 inches as well as a 360° rotation disk, reading both degrees and minutes. The movement may either be free floating on all axis or micro adjustments can be accomplished with the use of a precision lead screw and linear bushing drive system.

The compound is designed for adaptation to motorized operation with various types of control systems. GrafTek also builds compounds for special application motion picture and film animation effects.

For further information, contact: John Brenneman & Associates, 407 West Laguna, Tempe, AZ 85281. (602) 967-2542. ■

FILM OR VIDEO?

FILM OR VIDEO?

The Elemack Cricket for film or electronic photography.

Until recently, production techniques for film and video have varied greatly. The common need however has always been for good camera support to provide stability and mobility. Elemack has designed the first film and video production dolly that fills both these important needs.

MOBILITY

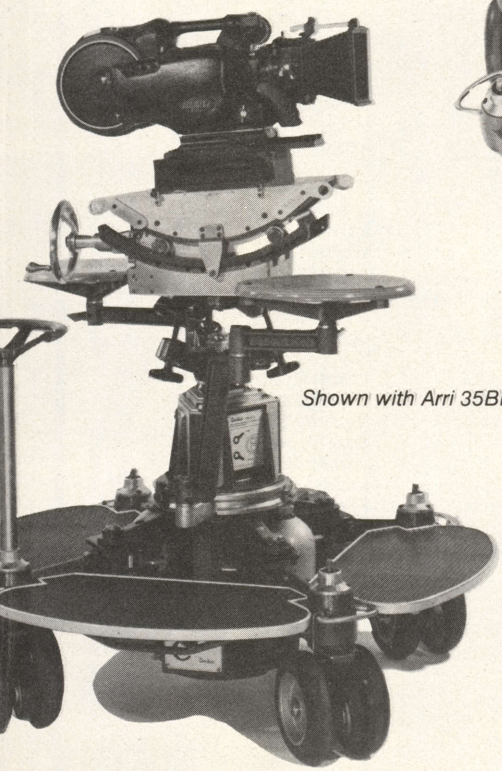
The Elemack Cricket dolly incorporates all the features of the heavier traditional studio dollies and pedestals, however its light weight allows it to be loaded with ease even in the back of a station wagon.

STABILITY

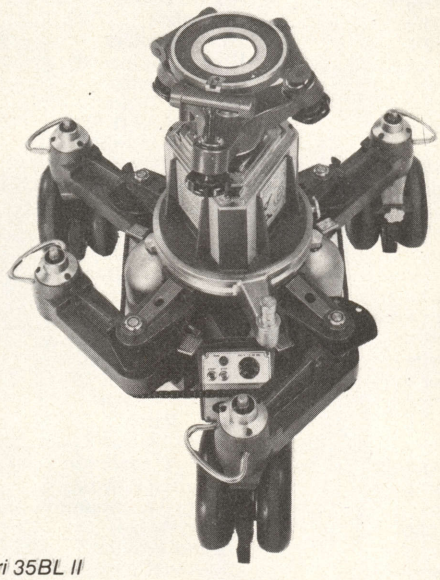
The new Cricket features a precision crafted hydraulic power column with up and down travel of 26″ and with automatic feathering at either end for soft starts and stops. Sturdy construction and precision fitting eliminates any possibility of column wobble.

GREAT LEGS

The secret of the Cricket's ability to work in cramped spaces lies in its legs. This patented design allows many adjustable positions. Its unique versatility offers remarkable ease of handling especially in tight corners and through doorways as narrow as 16″. The four synchronized wheels can be changed from *crab* position to *steer* by a simple push of a lever. The uniqueness of the Cricket does not end with its small size, its hydraulic power column, nor the design of its legs. With seating for two and by incorporating various accessories such as the jib arm and low shot bracket, the Cricket takes on many of the features of a production crane!



Shown with Arri 35BL II



Shown with Ikegami EC-35

NOW ON TRACK

Elemack's new patented flat top track coupled with the articulating bogy style wheels gives the video production the same freedom, style and mobility once only associated with film. Easily loaded onto the track, the fully loaded Cricket moves with less effort than other dollies for those smooth bump-free tracking shots.

Whether you are shooting film or video, your camera needs all the support it can get. The Elemack Cricket gives you all the support you'll ever need. Available for sales and rental.

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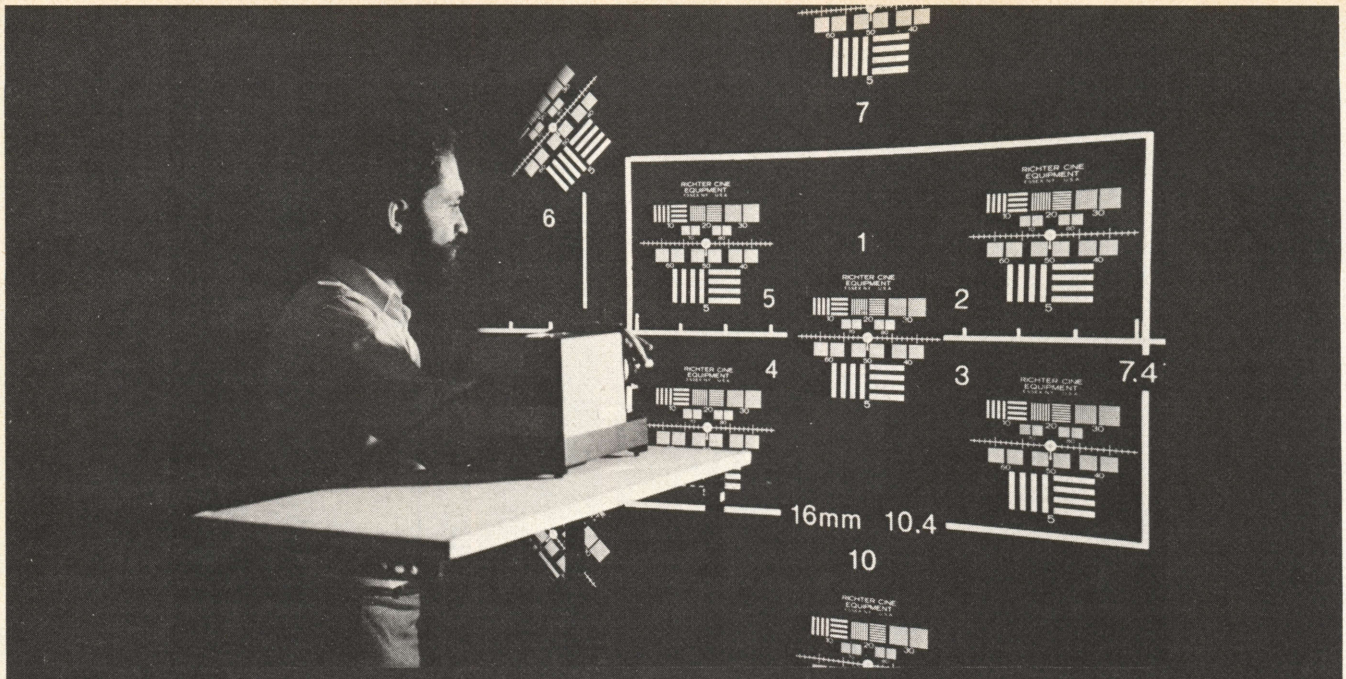

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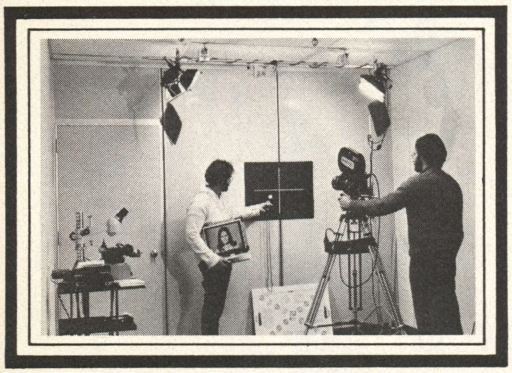

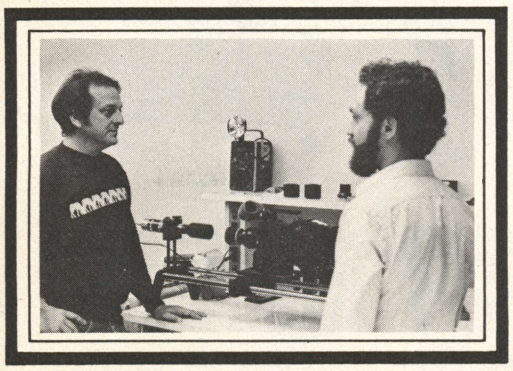

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Seen here with a handle and a video tape attached, the Feathercam is the lightest 35mm camera on the market. It features a snap-on magazine with automatic threading when the magazine is fitted.

FEATHERCAM CM35

By JOHN CARROLL

In 1980 Feathercam Inc. introduced the new prototype lightweight C.M. 35 camera at Photokina in Cologne and the S.M.P.T.E. show in New York. The response to the camera was very enthusiastic and most people could not believe that this 35mm camera was as light as it is, lighter in fact than most 16mm cameras. We listened to their comments and solicited any improvements they could suggest before the camera went into production. Upon our return to Los Angeles we discussed the camera with some of Hollywood's top cameramen. We knew we had a winner as there was not a second unit type camera on the market to touch it feature for feature, but we felt there were several improvements we could make that would make the Feathercam not only the lightest 35mm hand-held camera on the market, but also one that could be the foundation for a whole system.

With all the information gained from the feedback, we sat down with Al Beck and his son, Albert, of Cinemechanics. To make our improvements it meant that we would have to go to a whole new redesign of the camera to add features we wanted and yet retain the light weight. Great attention has been given in the design of this new camera to dependability, reliability, ease of maintenance and simple foolproof operation. The elegance with which these objectives have been achieved will be enough by themselves to assure its acceptance by the movie industry, but there is so much more.

Although light in weight, this new camera is loaded with features not found on most of the cameras which are currently in service. The new film transport mechanism is a new but simple concept. It provides two-claw pull-down and two-pin registration. The result is dependable performance and absolute image stability at all operating speeds. The whole mechanism can be removed from its base for servicing.

The film gate is much larger (6" long) than that normally found in other cameras. This provides for gentle but even pressure on a larger area of film and alleviates the possibility of film damage or emulsion deposits. No threading is needed either, as

A running shot with the Feathercam mounted on the "Pogo Stick," a pendulum type device which uses the weight of the batteries at the bottom to stabilize the camera for hand-held shots. Framing is accomplished with an electronic finder attached to the video tap.

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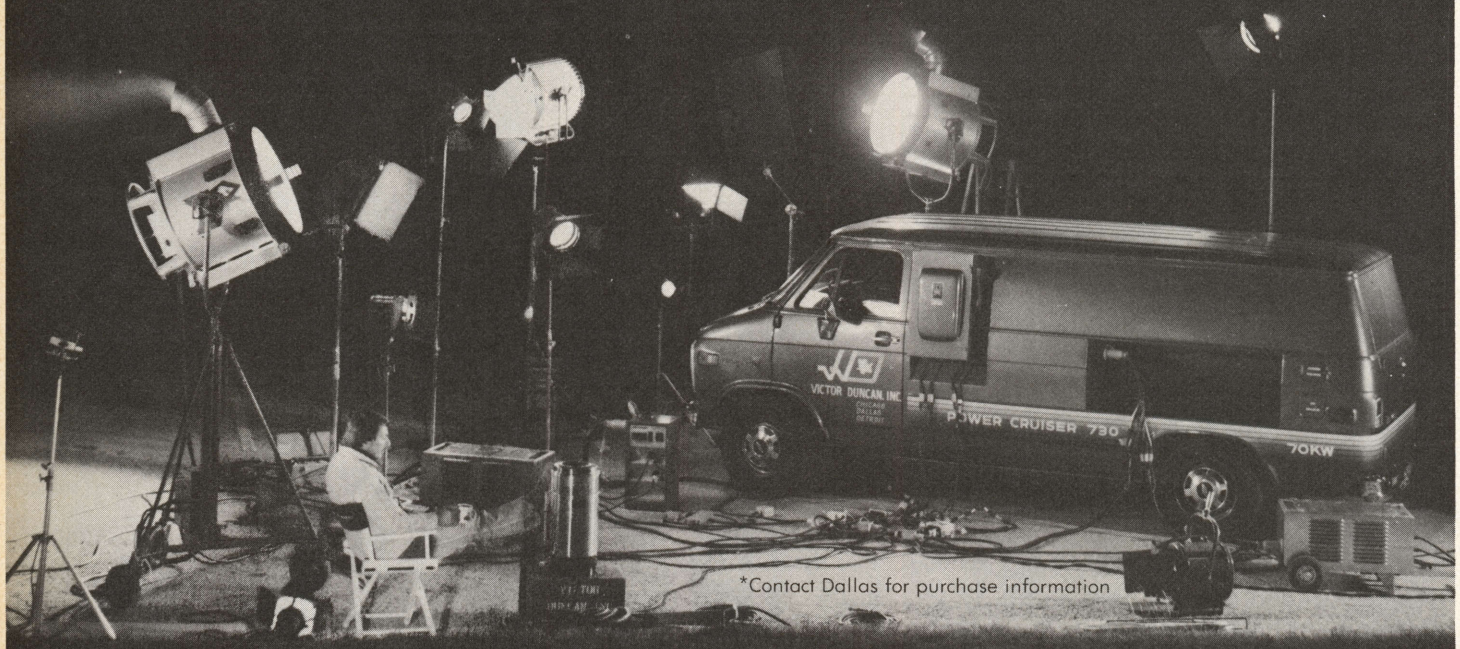

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this is automatically achieved when the magazine is fitted.

The 180° shutter is a dynamically balanced rotating reflex mirror set at an angle of 45 degrees to the light entering the lens. The shutter is also designed to stop in the viewfinder open position so no adjustments are required.

The snap-on 500-foot coaxial magazine can be changed on the camera in less than two seconds. The magazine is simplicity itself to load, since it incorporates a unique loop-forming threading system which ensures correct loading every time. When loaded there is no loop of loose film to catch or snag and no threading is required on the camera. Just snap-on the loaded magazine and shoot. A mechanical footage counter is incorporated into the magazine. At the request of many cameramen, an inching knob has been added to the camera. Most of the electronics have been taken out of the camera and put into a small base tray that sits underneath the camera and supports the magazine. This tray also holds all the switches and plugs to operate the camera.

A bright reflex viewfinder provides the operator with a brilliant image. It can be set for right or left-eye viewing in seconds and is never obscured by the shutter. An extension eyepiece has been added that extends the viewfinder to the rear of the magazine for tripod work and helicopter mount use, plus many other applications.

The motor provides variable speed performance with frames-per-second, over the range of 4 to 48. Whatever setting is used, the motor is electronically controlled to maintain speed regardless of film loading or temperature extremes. In addition two switch-selected quartz crystal locked speeds of 24 fps and 25 fps are provided. An instant "soft start" facility assures gentle film handling no matter what frame rate is selected.

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The camera operates from a 24v D.C. battery supply and two LED's, one red and one green, are fitted between the three-digit read-outs to indicate the condition of the battery supply. The supply is derived from a power supply unit or variously configured rechargeable battery packs which are designed to suit the application.

A video tap has been designed that is simplicity itself to add to the Feathercam by removing a plate on the right hand side of the camera. The whole video tap assembly can slide into position and be secured in less than a minute,and is very easily operated.

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A new hand-grip has been designed that features a koa wood handle for operating in all temperatures, on a sliding rod that is adjustable to different camermen's needs.

One of the biggest features that benefit the cameraman or rental facility is the ability to easily change lens mounts from Arri to Nikon to BNCR and many more, mounts that will accept both spherical and anamorphic lenses. By easily removing four screws the lens mount can be changed, making the Feathercam very versatile and compatible with virtually every lens on the market. Other lens mounts will be made upon request.

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Production is well under way and deliveries on this new camera will start early in 1982.

Further information can be obtained from Feathercam Inc., 7240 Valjean Ave., Van Nuys, CA 91406. ■

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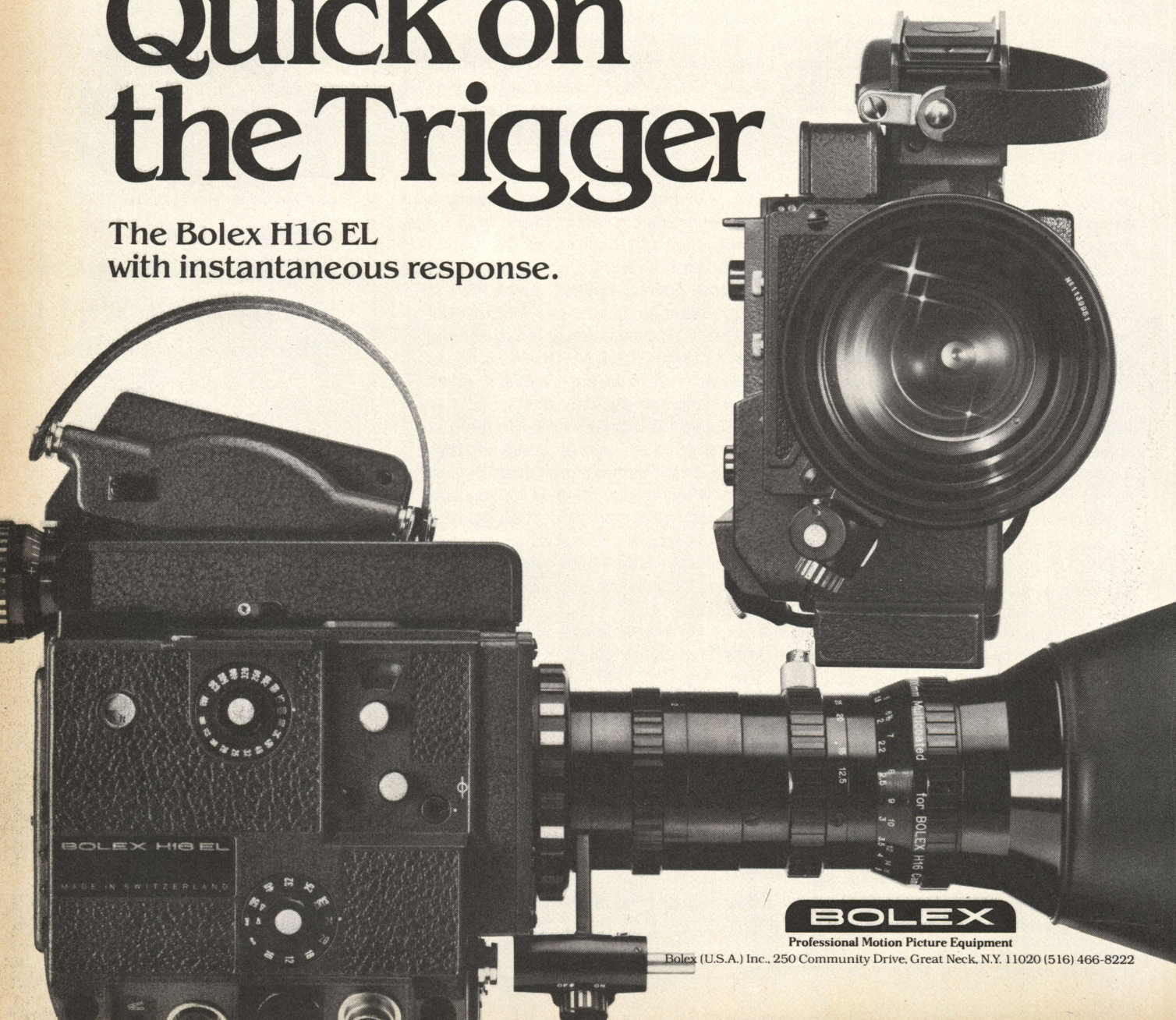

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THE FACTS ... THE PANACAM ON LOCATION

by Jim Gillie, Director of Photography

To shoot THE FACTS, a TV pilot for CBS, we subjected the Panacam to many varied shooting conditions. We took Panavision's new video camera out of the studio onto location. We did hand-held shots and candid camera work as well as travelling shots from a mount on the hood of a car. All this to create a unique feeling for this late night comedy show.

The director, Richard Goldstone, and I discussed at length the mood and look we wanted for this show. We wanted to get away from the kind of work that had been done in a video studio, even though our schedule required us to shoot videotape. We wanted to capture the feeling of the locations. I wanted to give the piece a very real look, to let the camera move with the action and use light to compliment the locations, not overpower them.

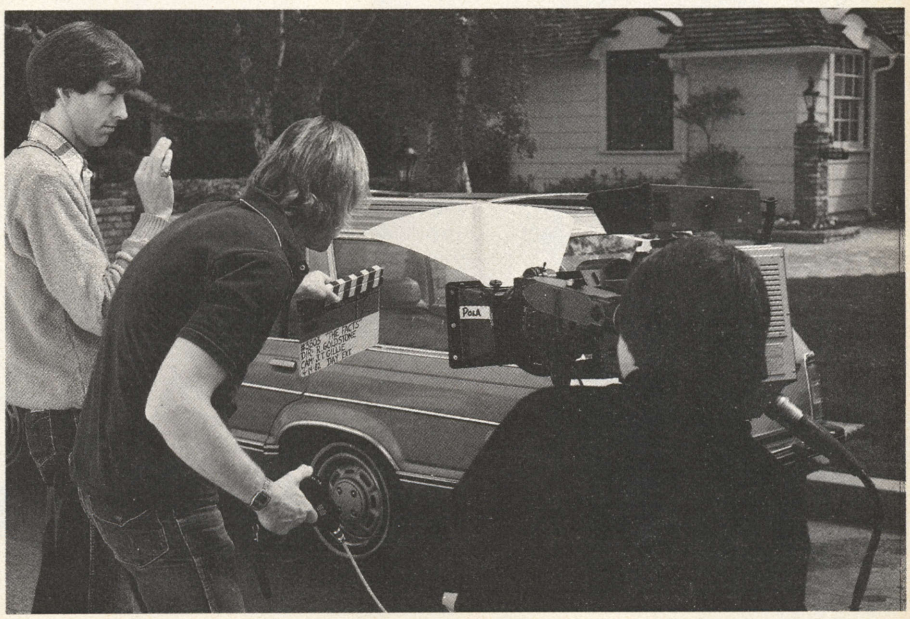
One shot started with a guy coming in the back door after saying, "Hi honey, I'm broke!" and stayed with him as he walked through the laundry room, past the breakfast nook, through the kitchen to the sink piled with dishes, to a bar that overlooked a patio as he fixed a drink and finally sat on a living room sofa. I wanted the afternoon light coming through the windows to contrast the darkness inside the house. We stayed with one uninterrupted hand-held camera move to let the audience enjoy his performance from back door to living room. The system that was perfected for the Panaflex made hand-holding the Panacam a pleasure.

In addition to the hand-held work, we had scenes that required the gear head, scenes that called for an extreme telephoto to shoot candid interviews, as well as a very wide angle "surveillance" look for a comedy skit with two cosmonauts in space. I needed more than an electronic news gathering camera, I needed a whole video camera system. After surveying the market I selected the new Panacam because it combined the high quality CEI video camera with the already advanced and perfected Panaflex system, not to mention the availability of 7000 of the world's finest lenses. And instead of being a strange piece of equipment, from the film plane forward it was a Panaflex, and from the film plane back it was a CEI, so any operator would be familiar with the front and any video engineer familiar with the electronics. Deciding to use the Panacam also made the producers and Richard happy because they had relied on Panavision in the past.

There are many things I like about images photographed in backlight. That was not going to be a possibility with some of the locations we had, but at least I was confident we could keep continuity of sun angle within each scene. However, one of the funniest shots in the show, and it is a comedy, was made looking straight into the sky. We had the camera inside a station wagon facing out the open back at two women who were arguing over a suitcase filled with "just a few small appliances." To minimize the amount of bald sky in the frame, we "cheated" the car around a little to increase the amount of a nearby tree we were seeing, and then a few clouds came up. Keith Winakoff, our video engineer, was able to help electronically by letting the sky "clip" and increasing the black stretch. We were able to add just enough fill light through the car into the faces of the actresses to catch their reactions. We ended up with a realistic, pleasing, and also a very rich image.

Having a good video engineer who could manipulate the electronics of

Director of photography Jim Gillie checks framing in the electronic finder as assistant cameraman Todd Henry and operator John Toll prepare for a shot on location with the Panacam.



Photos by Larry Jandro

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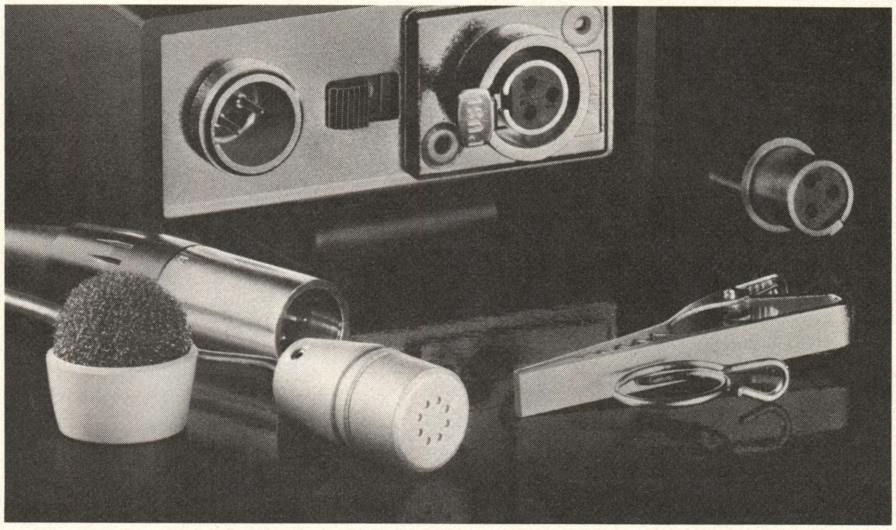

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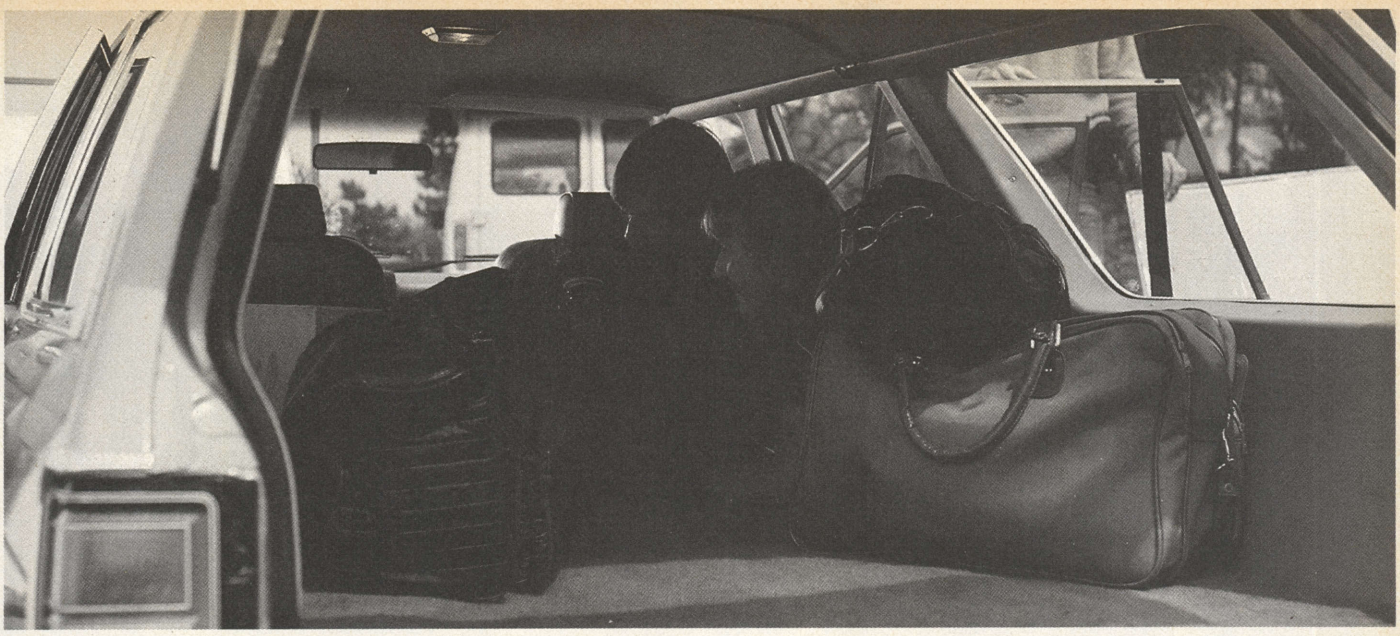

John Toll and Todd Henry prepare for an angle from inside a station wagon of two women loading luggage into the car. By adding a minimal amount of fill light on their faces, stretching the black and letting the sky behind the ladies clip, Gillie was able to shoot towards the sky.

the Panacam gave me the flexibility to season to taste the look of an image. It allowed us to match parts of that scene during which the sun and clouds were playing hopscotch with our location. Keith made it possible to vary the contrast and other parameters of the image with a more immediate and positive touch than had we been shooting film.

To take full advantage of the mechanics and optics of the Panacam I wanted an operator who was an accomplished film operator. Another director of photography, Allen Daviau, whose advice was helpful throughout the production, recommended John Toll as "one of the best hand-held operators." John's philosophy of camera operating was simply "to put the camera in the right place at the right time to capture the action." This was put to the test in one of the funniest scenes of the show, wherein a young lady was exploring a singles bar for the first time. The camera played as her point of view. The bar was peopled with sleazy characters trying to pick up the camera with some ridiculous "come-on" lines. The woman's point of view had to appear to be repulsed by one character only to be replaced by another more repulsive one. Since everything pivoted on the camera's movement and placement, composing the frame and reacting with the camera was a full time job. To also pull focus would have been too mechanical a distraction to allow John's full sensitivities to properly move and place the camera.

Because the assistant could use the Panaflex follow focus extender with the Panacam, he easily maintained focus and moved fluidly with John. The shot was a perfectly composed and clearly focused but grotesquely funny view of life in the singles bars.

One other feature that is unique to the Panacam but is familiar to most film operators is the small "safety" area beyond the frame that the operator sees. In order to increase the humor in the walk through the singles bar, we worked with a very wide, 17mm lens. This posed a problem in that for the dialogue to work, the camera needed to play very close to the actors' faces. This caused shadows of the camera itself to fall on the actors. With the extra field of view, John could place these shadows precisely at the edge of the frame without impinging on it. Had we been using a video viewfinder, we couldn't have seen those shadows until they entered the frame.

One difference between film and video that was helpful in this scene was the use of playback. We shot videotape "film style." That means the director worked next to the camera on the set with the actors, shooting one setup at a time. Some directors gravitate to film or videotape depending on their personality. Many directors feel comfortable studying the details of each take over and over as it is played back, so they can make all the adjustments they want before shooting the next take. By contrast directors who gravitate to film tend to put their trust in the cameraman to refine the composition of the shot and spend the time laying down additional takes to keep the actor's momentum fresh. Our schedule for THE FACTS was very tight so we necessarily kept playbacks to a minimum.

However, by watching the playback of our singles bar, we were all able to make adjustments and refinements

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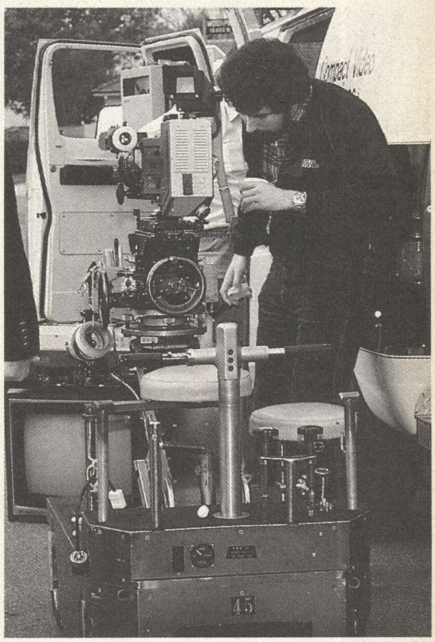

Video engineer Keith Winakoff checks out the Panacam in the morning. Gillie insists that having a good video engineer along is the only way to get the maximum value out of a camera like the Panacam.

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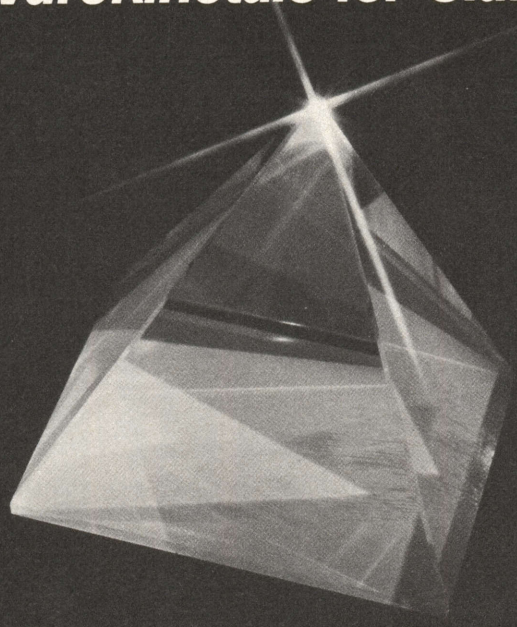

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ALTMAN SHOOTS SUPER-16

By HERB LIGHTMAN and MICHAEL DUVALL

Robert Altman fulfills a long time determination in his filming of COME BACK TO THE FIVE & DIME, JIMMY DEAN, JIMMY DEAN, by shooting this feature in Super 16. It will be a theatrical release in 35mm this fall.

In the 60s when Altman was directing television, he tried to persuade the networks and studios to use 16mm instead of 35mm, without success. When he left television to direct features in 1967, he still carried the banner for 16mm and voices the opinion that many things done in the 35 format could be done as well—and less expensively—in 16.

At this writing he is completing work on JIMMY DEAN, a picture from the original stage play, shot on a stage. He says it can be released for viewing on television, or blown to 35 for theatre projection. "I think anything for television could be shot as easily in 16mm as in 35mm. I wouldn't have shot BUFFALO BILL or QUINTET in 16, but when you look at TREE OF THE WOODEN CLOGS, you won't ever see anything more beautiful.

"Most of my theatrical films, I'd say 80% of them, were shot anamorphic, because I like that format. We're not shooting with anamorphic here obviously because when those films go to television they look terrible. This way I've got to say that my television framing is as important as my theatrical, so by using the Super 16 frame I am able to compose, not perfectly, but well enough that it is very good in both sections.

"I think there is an added quality when we blow up to 35mm. With all the good lenses now available, you just end up dropping glass in front of them to diffuse them or to add grain or to get rid of that absolute high gloss quality. When you shoot in 16mm and blow up, you get a certain effect. If you know what that effect is, if you study it enough, you find that it can take the place of a filter.

"Super 16 gives you not only that much more for a normal blowup, but also gives you the format. That 1:66 format—and you can also easily go to a 1:85 format—if you know you have the light, you can get a really good negative."

Lighting is the key and for JIMMY DEAN, a computerized lighting console made possible the unusual effects Altman sought for his "then" and "now" atmosphere so essential to the picture.

Ed Graczyk's play, which Altman directed on Broadway, starred Sandy Dennis, Cher, Sudie Bond and Karen Black. Set in Texas at a Woolworth dime store, the story deals with a group of women who belonged to a James Dean fan club. The action unfolds between their high school days of 1955, when Dean was filming GIANT nearby, and 1975 when the now disbanded club members gather for a reunion.

Originally, the feature was to be shot on tape, but Altman convinced the producers to let him use 16mm. "What this is ultimately going to become is a wonderful test of 'how'—because when I finish this and we blow it up to 35mm, I promise you, nobody in the world is going to know that it wasn't 35. I'm very happy with it," Altman asserts.

Altman described the problems with shooting a stage play so that it doesn't appear as such. "We were in the Martin Beck theatre with this play and it has 1322 seats, so literally there are 1322 sight lines. Nobody sees everything exactly the same, so it has to be staged in such a way that everybody can pretty well see everything. The minute you take it away from that proscenium and put it through a camera, whether it is going to be seen in a motion picture theatre or on a television screen, it comes down to a single sight line.

"I don't have to stage in such a 'stagey' way. I also have the opportunity to lose people without having them make an exit. While the play itself isn't being changed—the words, the plot or the progression—where I place the audience *is* being changed. We still use the theatrics of the play, but I am not forced to make compromises because of all those sight lines.

"The actors are not forced to pro-

Robert Altman directs scene from COME BACK TO THE FIVE & DIME, JIMMY DEAN, JIMMY DEAN. Left to right are Kathy Bates, Marta Heflin and Cher, who play members of a Jimmy Dean fan club "then" and "now."

ject. We can play sort of under the breath. It's really a proper combination of the two mediums. I don't think I would take every play I've seen and do the same thing with it, but this should make a very interesting motion picture and/or television show."

The effect of two separate time spans in the lives of the characters was created by the lighting. In the film, as in the play, two identical sets (the dime store) each a mirror of the other, were used. One set is "then" and the other is "now." In the stage version during the opening minutes to establish the premise, Altman used visual doubles of Cher and Sudie Bond. The doubles "mirrored" the actions of the stars as they went through the motions of opening the store. In the film, a two-way mirror was placed between the adjoining sets and by lowering the lights on the "now" set and bringing up the lights on the "then" set, and shooting "through the looking glass", the audience is taken back and forth as the story demands. The "then" side was lit to 3500 degrees Kelvin, 300 degrees more than the "now" side. It was decided not to correct the color difference (bluer on the "then" side) as a way of differentiating between the past and the present. The Mirex material used as the "mirror" also tended to diffuse the image, making the actresses appear younger on the "then" side. Except for closeups, the camera remains on the "now" side looking through the mirror.

Pierre Mignot, director of photography, chose to shoot at 2.8, using an Aaton 7LTR. "Because it supposedly takes place in Texas," he explained, "I decided to shoot it almost wide open. In Texas it is very hot. With no depth of field, you get the feeling of heat."

Occasionally Mignot would use two cameras set side by side to keep the compromises in lighting and staging to a minimum. "On a scene that may run, say for six minutes, with two people talking, you have to go through it so many times that you naturally fatigue your actors. They may get bored and lose spontaneity," says Altman. Hence, the two cameras, one usually picking up a master shot and the other picking up a closeup of one person. "It just saves me the time. If I had all the luxury and time in the world I would not use two cameras."

The Aaton was designed with Super 16 in mind and requires about 30 minutes to an hour for conversion. The ground glass and aperture plate must be changed and the lens retaining system recentered. The retaining system and the viewfinder must all move at an adjustment for the one millimeter difference between regular and Super 16. Aaton plans to bring out in the near future, a universal ground glass which will necessitate only recentering as opposed to replacing.

Super 16 is already in a wide screen format since the image area is extended into what was formerly the sound track space. In the past, there was great concern when shooting Super 16, with the image area being scratched going through gates, magazines and printers. But with the use of precision ball bearings on printers, refinements on gates and magazines, these problems have been significantly reduced.

SUPER-16 ON WILDROSE

Director John Hanson and producer Sandra Schulberg have spent the past two years living among the inhabitants of Minnesota's Mesabi Iron Range researching their new film, WILDROSE, which will document life on the Mesabi Range. Their first collaboration on this type of narrative-documentary filmmaking was NORTHERN LIGHTS, their film on the Nonpartisan League in North Dakota just before World War I. Shot in 16mm black and white and optically blown up to 35mm at DuArt Film Labs in New York, NORTHERN LIGHTS took the Camera D'Or Award at the 1979 Cannes Festival.

While the stark and grainy, black and white look of NORTHERN LIGHTS perfectly suited its dark story, WILDROSE is being shot in color with all the traditional production values typical of American feature films. To achieve an equitable balance between the demands for those production values by the feature film release market and the constraints imposed by any independently financed production, the producers decided to shoot in Super-16. For the shoot, Hanson and Schulberg selected the Arriflex SR Super-16 camera, and DuArt Film Labs again for dailies and the blowup to 35mm. Within the confines of their budget, both felt that their significantly lower raw stock and dailies costs, the flexibility of smaller crews and the smaller camera configuration of 16mm, and the 40% increased image area made available for blowup all more than compensate for the fact that shooting WILDROSE in 35mm was virtually impossible for them.

Cinemtographer Todd Crandall, who chose the new Arriflex SR Super-16 camera to film WILDROSE, had additional reasons for selecting the SR. "I already own an SR, and have already invested heavily in building a pretty complete SR system. Because Arri seemed to design the Super-16 camera to accept all the Arriflex accessories and all the Superspeed primes that I already own, all I really needed was the new Super-16 body and I was ready to go."

Locations for WILDROSE, which began shooting in early July, will include summer and fall, day and night above-ground work, and extensive shooting in deep, underground mine shafts, utilizing extremely low light levels, hence the need for his Zeiss Superspeeds.

"I was initially concerned more about the fine, gritty dust in the mine shafts working its way into my SR magazines, which are my own and of course unmodified for Super-16, than I was about the dust getting into my lenses. But after some extensive testing at home, I found that the seal around the SR's magazine was impervious to anything I 'threw' at it." says Crandall.

Jurgen Schwintzer, Manager of Technical Services at Arriflex, notes that the SR Super-16 body is the standard 16SR-II camera with modifications made to the front body castings, a repositioned lens mount, a modified viewfinder with Super-16 aspect ratio markings on the interchangeable fiber optic screen, and a repositioned tripod mounting thread and locating flange that aligns with the new optical axis to insure that all standard 16SR system accessories can be used without modification.

The Aaton has an optional video viewfinder which transmits a signal to a video recorder. Altman used the video assist while shooting JIMMY DEAN. He found it useful when doing a scene with a lot of critical moves. It would be instantly apparent whether it was a satisfactory shot or had to be redone.

A Cooke zoom lens with a 10.4 to 52 range, t2.8, designed for Super 16, was used on the shoot. It resolves at 100 lines per millimeter at the corners, focuses down to nine inches and has virtually no flare. Prime lenses used were Zeiss super speeds, 9.5, 12, 16 or 25. In addition to the Cooke lens an Angenieux 12-120 was employed in order to facilitate closeups. Mignot claims there is no real color problem intercutting between these two lenses.

On video, Altman says, "I think eventually, if we can put people on the moon and get back photographs of Jupiter, there's no reason that film can't be replaced by electronics, but I don't think we've got that yet, and I don't think there is any point in saying that we have—but we can take the film, transfer, change editing capabilities, etc. You don't have to go whole hog. You can take the best of both worlds.

"I can sit there and watch certain sequences that are critical on a monitor and know what I've got and I don't have to shoot it 17 times, and I don't get surprises in the dailies. I know certain key things that happen. I can edit this film in a conventional way, and then I can continue to edit after I've transferred over to tape. I can do any combination. I can use all of the best of both worlds. I like the video assist for certain sequences, but I wouldn't like to sit in a truck and depend on it because I think I lose contact with the humanism of being that close with the actors."

Altman brought theatrical lighting into his film with the use of a computerized lighting console. "I don't think I would ever shoot again without a computerized lighting board," he says, referring to his interiors.

The lighting console was used essentially for creating effects, according to Jonathan Lumley, gaffer. "One of the things we are able to do is change our lights rapidly from one side to the other since the picture is based on special effects being caused by the lighting. If we have light on the front of the subject we see the front and if we have light on the back of the subject we see the back. At the same time we can also use the board for dealing with levels and lights to an extent. Of course we have to be extremely careful about color temperature, though we can be a lot more liberal because of the mixture of the kinds of light and the ability of the lab to deal to a certain extent with the color temperature being slightly off.

Altman and Director of Photography Pierre Mignot consult on a shot for Jimmy Dean. The picture, now being released to theaters in 35mm, was photographed in Super-16.

"The board itself is extremely versatile. It's designed for the theatre and television and it has a certain number of drawbacks. It doesn't quite give us the speed of trimming the lamps in the same way as we would normally do on a classic movie setup. It means that we do have to punch in the commands which takes a little longer than simply flooding or spotting a lamp.

"Generally speaking," Lumley adds, "it gives us more versatility in an entirely different way. It's certainly the first set I've ever worked on where we've been able to use a dimmer board in quite this way."

Wiring the layout to accommodate the lighting console proved to be quite an undertaking. Within an area of 75' by 75', there was more than a mile of single extensions. Every unit had a specific number pack. Endless diagrams, maps and lists were compiled to keep track. On the lighting console, a monitor told the operators what lights were set up on the set and at what level. One problem associated with the use of theatrical lighting consoles for filming is the color temperature shift caused by a dimmer, but Lumley feels that the potential of the new computerized lighting consoles far outweighs this limitation.

"Color temperature differences are now more acceptable and we are not nearly so concerned about fluorescents going green—but, even so, this is not a problem we have. Generally speaking, we feel we can do just about anything. It's opened up a completely new point of view about lighting. We think it's a pretty revolutionary thing, though we are not alone in having done it," Lumley concludes.

Altman used wireless mikes going onto 8-track, as he has done in many other films. (See AMERICAN CINEMATOGRAPHER, April 1980) The multi-track system, used mainly in the music industry, allows the director the luxury and the flexibility to alter all or part of the sound track to suit his needs.

Using wireless mikes, each actor is recorded on a separate track. This frees them from having to worry about getting the right mix while filming. During editing, if Altman decided he wanted to change the balance in a scene to favor another actor, he could do so. It saved looping and let him use a scene that otherwise might have been lost.

"It's an extravagance," Altman says, "but it is worth it."

Reviewing his experience with Super 16 and JIMMY DEAN, Altman concludes: "It is becoming a format for all seasons, and I think this taking of a play, and putting it on video or film is going to create a different style and is going to allow more small, intimate, impressionistic, abstract films to be done. I think it's going to offer more opportunity for artists to do that. It's as exciting as any work I've ever done." ■

THE SUNDANCE INSTITUTE

Nestled in the Wasatch mountains in Utah is a small ski resort owned by Robert Redford which during the summer houses the Sundance Institute. For the month of June eight or ten filmmakers come there to work on the development of independent features with the help of some 50 writers, directors, actors, producers, cameramen, production designers, distributors, executives and agents in an atmosphere which is like a combination of summer camp, film school and film festival. The Sundance Institute grew out of Redford's desire to foster independent filmmaking. More specifically it was conceived as a means of supporting regional films which are narrative and essentially humanistic. It is not geared towards avant garde or experimental films nor is it concerned with documentaries. It focuses on films which tell a story with actors but which do not offer the kind of immediate commercial exploitability that is generally required to attract mainstream financing.

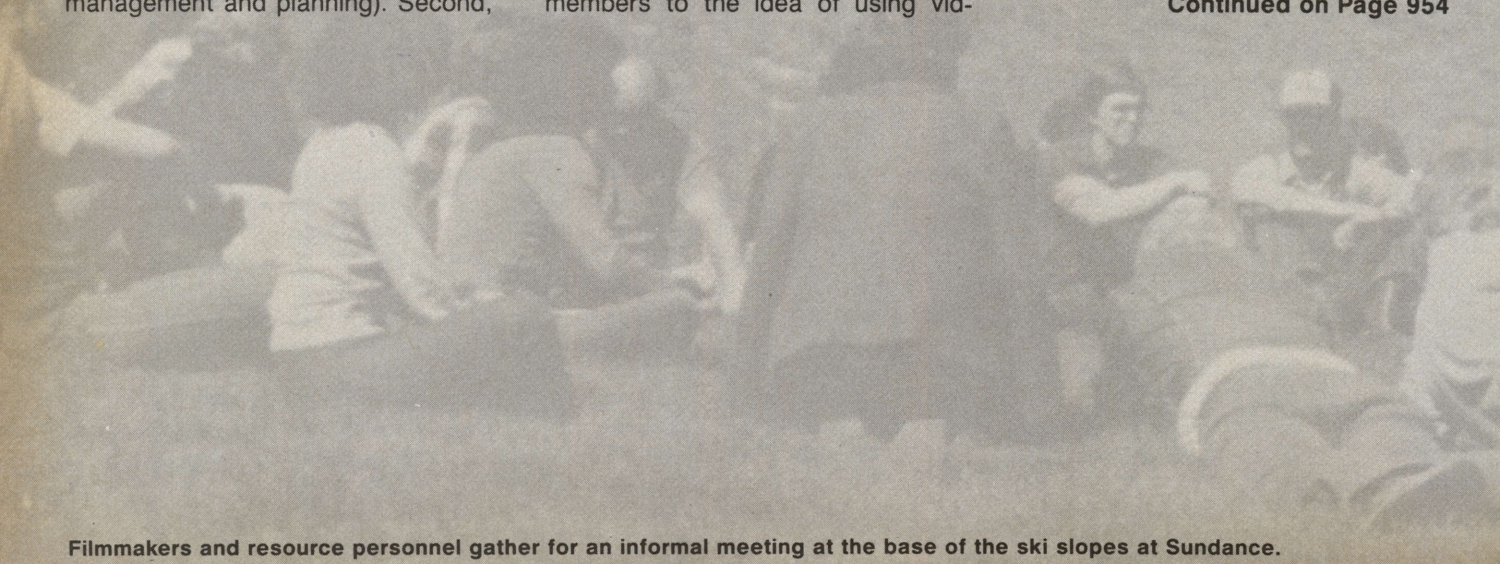
According to its brochure the institute has three goals: "First, to nurture new talent by helping filmmakers to work on essential aspects of their craft (story-telling skills, the ability to work with actors, and production management and planning). Second, to explore new and responsible ways of producing, financing, and distributing feature films. Third, to support the production of well crafted, low-budget feature films for a variety of markets."

In many ways Sundance seems very reminiscent of the American Film Institute Center for Advanced Film Studies in its early years, and in fact one of the principal figures at Sundance is Frank Daniel, the former head of the Czech Film School who was brought to the U.S. to be the dean of the AFI center. Like the AFI, Sundance is based on the idea that aspiring filmmakers can benefit from seminars and workshops with established Hollywood professionals, but it differs from the AFI in several ways. Perhaps the most significant is that it chooses projects rather than individuals. In this respect it is modeled after the television workshop at the Eugene O'Neill Theater Center where teleplays are developed, rehearsed and taped in a very rough form with the idea that they can then secure financing for production.

Sundance was conceived with the idea of concentrating on feature films rather than films for television—so much so that there was even resistance among some of its board members to the idea of using videotape for the workshops. This prejudice was dispelled by the realization that working in film was impractical, given the goals and the schedule of the institute and by a generous offer from Sony to loan Sundance the necessary video camera and editing equipment. None of the filmmakers attempts to make a sample reel or finished sequence from his film during the month at Sundance. All of the production work that is done is designed as a workshop experience in which the learning process is considered more important than the final product. One of the rules at Sundance, in fact, is that none of the videotapes leave the institute. This takes pressure off the filmmaker so that he can derive full benefit of what Sundance has to offer and, even more importantly, it frees the actors who contribute their time and services to let loose and experiment in the scenes being taped without having to worry about who is going to see the tape.

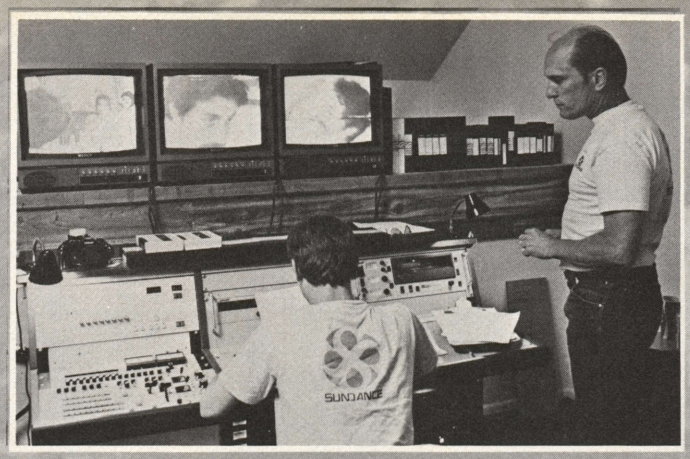
Each filmmaker who brings a project to Sundance works with the program committee in advance to devise a program which is suited to the needs of his or her particular project. All of the filmmakers are put together

Continued on Page 954



Filmmakers and resource personnel gather for an informal meeting at the base of the ski slopes at Sundance.

By RICHARD PATTERSON

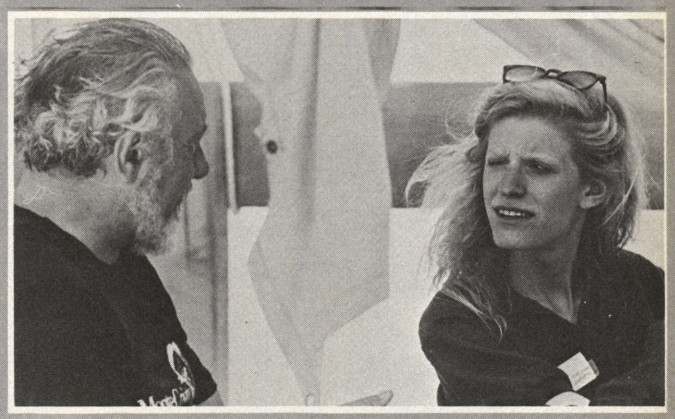


Studio 9/T J

Robert Duvall discusses a scene with editor Lee Nersesian during a videotape editing session using one of two editing consoles provided by Sony.

Studio 9/T J

Ian Calderon, producer/consultant in charge of production for Sundance, observes as Brian Sullivan prepares to shoot part of a scene from one of the filmmaker's scripts.



Studio 9/T J

Frank Daniel and Marisa Silver discussing her script which was one of the seven projects chosen for development at Sundance.

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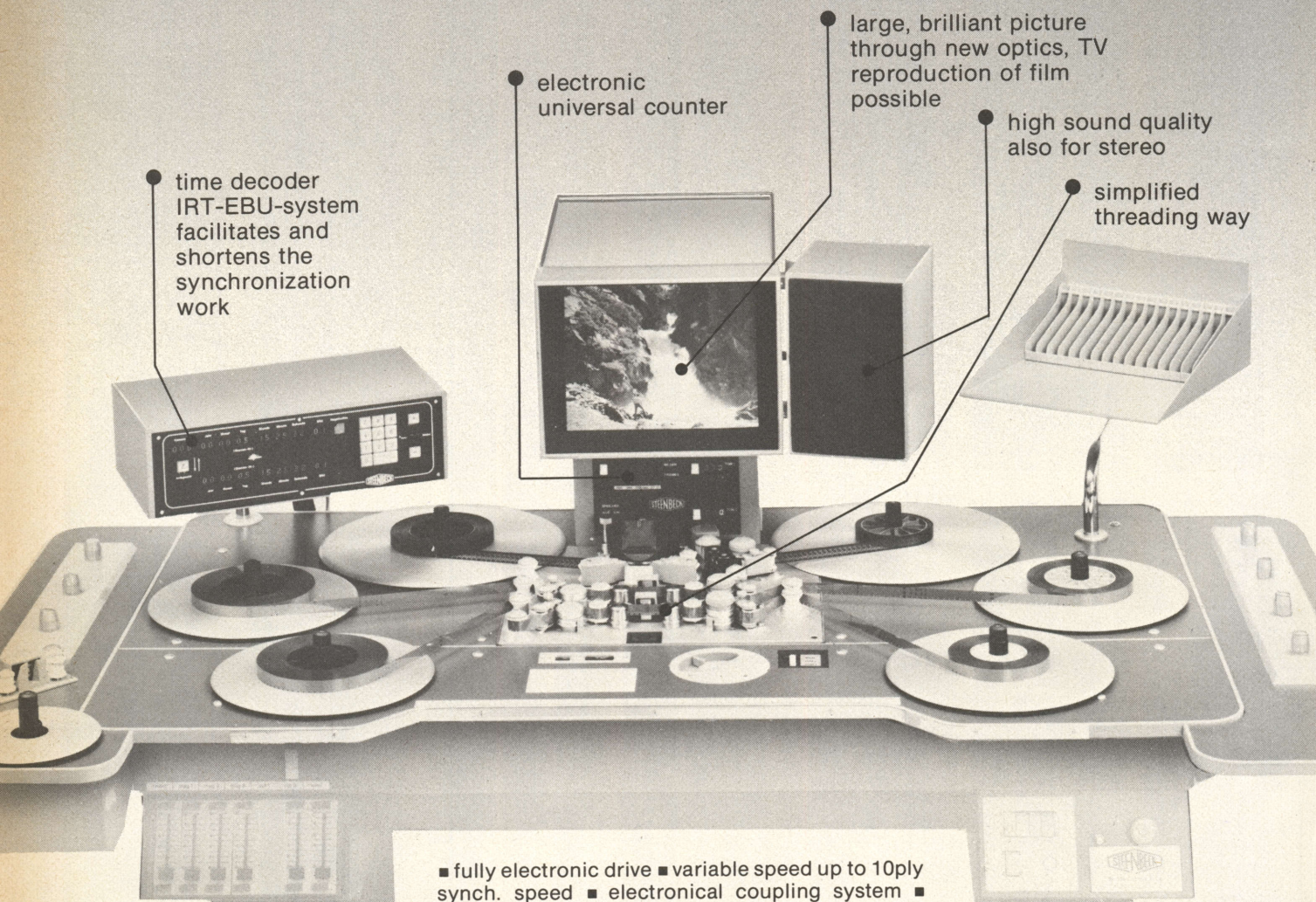

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PHOTOKINA 82

The Making of GUNGA DIN

THRILLS FOR A THOUSAND MOVIES PLUNDERED FOR ONE MIGHTY SHOW!

This phrase from one of the newspaper ads for GUNGA DIN offers a fair assessment of the picture—allowing, of course, for some traditional Hollywood exaggeration. Make that a *dozen* ordinary movies and it's no exaggeraton at all.

GUNGA DIN was produced during the latter half of 1938 and the first two months of 1939. It was one of a mere handful of pictures made during the Thirties that cost close to $2,000,000—an amount exceeded only by HELL'S ANGELS (1930), GONE WITH THE WIND (1939) and maybe one or two others. In those days of 25¢ bargain matinees (10¢ for kids), Bank Night, double features and free dishes, such a show hadn't a chance to make a profit. Fortunately, GUNGA DIN proved popular enough to be reincarnated often as a reissue, and eventually it brought in a lot of money.

The picture was inspired by an 1892 poem by Rudyard Kipling, a young Englishman who was born in Bombay and had spent much of his life in India. Written when Kipling was 27, it was a tribute to the regimental *bhisti* (appropriately pronounced "beastie"), the native water carriers who accompanied the British soldiers and irregular troops during their campaigns against the tribes of the northern boundary. In the rough lingo of an infantry private, it tells of a lowly *bhisti* who loses his life while trying to help the wounded. The soldier declares that

> "...though I've belted you and flayed you, By the living Gawd that made you, You're a better man than I am, Gunga Din."

Kipling died in January, 1936. Two months later, rights to the title, GUNGA DIN, were purchased from Kipling's widow by Edward Small and Harry Goetz for their independent company, Reliance Pictures, which headquartered at RKO Pathe. William Faulkner was assigned to develop a scenario suggested by the poem. The novelist produced treatments and a partial script. In June, Reliance was liquidated and Small joined RKO as a producer. As a part of the deal, the studio inherited the screen rights to GUNGA DIN, for which Small had paid $5,000. Lester Cohen and, later, John Colton, prepared treatments for a version proposed as a King Vidor production.

Howard Hawks joined RKO in September and, ignoring the existing adaptations, began work in New York City on a new version with the madcap writing team of Ben Hecht and Charles

By GEORGE E. TURNER Photographs by ALEX KAHLE

MacArthur. By the end of the year the trio had written a story which closely resembles the movie as we know it. It was envisioned as a spectacular production with top-line players. Among those considered for leading roles were Ronald Colman, Victor McLaglen, Madeleine Carroll, Robert Montgomery, Robert Donat, Roger Livesey, Clark Gable, Spencer Tracy, Franchot Tone and Jack Oakie.

Hawks and Dudley Nichols continued to polish the GUNGA DIN script and Hawks produced the Cary Grant-Katherine Hepburn comedy, BRINGING UP BABY, which went well beyond the budget and schedule. Soon Hawks was at loggerheads with the vice-president in charge of production, Sam Briskin, and his long-term

Art Director Perry Ferguson shows his sketch of the proposed hidden temple to Director George Stevens. Below, the finished set.

Fairbanks in the thick of the fighting at Tantrapur Village.

contract was terminated in 1937 by mutual consent. Before the end of the year Briskin also left the financially troubled studio to be replaced by young Pandro S. Berman, a strong producer who had learned the business under David O. Selznick and Merian C. Cooper.

Berman considered bringing Hawks back to make GUNGA DIN, but felt he was too reckless with time and money to entrust with a project which, at best, was certain to strain the company's resources. George Stevens, who was under contract to RKO, seemed a less risky choice.

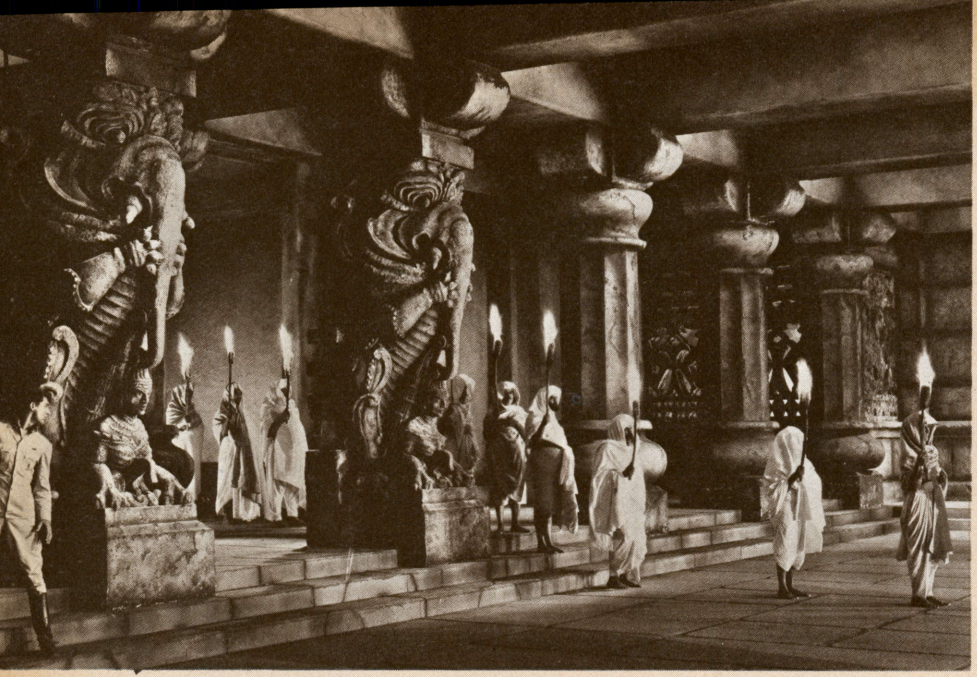
Stevens had been a cinematographer, most notably for Hal Roach comedies and Westerns during the late Twenties and early Thirties. He began directing Bert Wheeler and Robert Woolsey's popular comedy films for RKO in 1932 and soon graduated to the likes of ANNIE OAKLEY (1935), with Barbara Stanwyck, ALICE ADAMS (1935), with Katherine Hepburn and VIVACIOUS LADY (1938), with Ginger Rogers and James Stewert. He was noted for working with quiet, easy efficiency and hewing close to RKO's often stringent budgets.

The Hecht-MacArthur yarn had plenty of action and some great individual "gags," but lacked cohesion and overall suspense. As the starting date (late in June) neared, Stevens and two writers, Fred Guiol and Joel W. Sayre, retreated to Arrowhead Springs, a mountain resort area, to complete the script. Guiol was a comedy writer-director who had worked with Stevens at the Roach Studio and had succeeded him as director of the Wheeler and Woolsey features. Sayre was a former newspaperman and novelist (RACKETY RAX) who had written scripts for ANNIE OAKLEY (1935), THE ROAD TO GLORY (1936) and others.

Guiol's research turned up what Stevens felt was "an essential thing necessary to glue this whole thing together"—an article about the Thuggee cult. This was a secret society dedicated to the worship of Kali, a four-armed Hindu goddess who, the Thuggees believed, demanded human sacrifice. The Thugs (the name has remained in the language to denote any violent criminal) killed more than a million persons in India before they were put down by Lord William Bentinck, governor-general of India from 1827 to 1835. They had their own language and all carried "strangling cloths" with which to kill their victims (it was forbidden to spill blood) and small pickaxes with which they were obliged to dig the graves of chosen victims in advance. Bentinck imprisoned 1,562 Thugs, hanged 382 and exiled 986. These mysterious assassins were far more dramatic and frightening than the bandits envisioned by Hecht and MacArthur.

Several weeks before the official shooting script was written, Stevens and the unit art director, Perry Ferguson, flew to the little desert highway town of Lone Pine, California, in the foothills of the High Sierras. Stevens knew the place well, having photographed Westerns in the vicinity, and realized it strongly resembled the northwest region of India. Locations were selected in the Alabama Hills, a stretch of weirdly eroded rock formations towering over desert terrain and backgrounded by Mount Whitney and several smaller snow-capped peaks. Ferguson made his preliminary set designs at the sites where they were to be constructed. The first was the frontier village of Tantrapur, which covered about eight acres, and included a business section, European quarters and the native quarter. Six miles away the military cantonment and parade ground was planned. Two miles nearer the base of Mount Whitney, in a natural valley surrounded by towering rocks, was the site of the hidden temple, headquarters of the neo-Thuggees.

Douglas Fairbanks Jr., Victor McLaglen, Eduardo Ciannelli, Sam Jaffe and Cary Grant on top of the temple. This is a soundstage mockup of a part of the set with process projected background.



All of these settings were built more solidly than most because they had to stand up under the vagaries of desert weather and because a great deal of stunt action was planned on the rooftops and stairways of both the native village and the temple. About 200 men worked for four weeks setting up tent quarters and galleys for the cast and crew. Once the quarters were established, a procession of studio vehicles arrived consisting of 16 cars, 12 trucks, 10 30-passenger buses and a large trailer housing a film laboratory. More than 500 technicians settled into the tent city to prepare the sets.

The story occurs during Victoria's reign, some 50 years after the last known Thuggee activity. A rollicking trio of sergeants, MacChesney, Cutter and Ballantine, are sent to investigate a village whose entire population has vanished. Attacked by a large force of fanatics, they hold off the enemy by throwing dynamite and return with evidence that the villagers were destroyed by Thugs. Eventually a treasure hunt leads them to a secret temple in the mountains which proves to be the stronghold of the Thugs. The soldiers capture the Guru who is the spiritual leader of the Thugs, but he sacrifices himself by leaping into a pit of snakes so his followers will not be deterred from carrying out his plan to ambush a detachment of English troops. Through the bravery of the sergeants and the regimental *bhisti*, Din, the regiment is saved and the Thuggees are defeated in a terrific battle.

Through this narrative runs a romantic sub-plot involving Ballantine's engagement to the beautiful but clinging Emmy Stebbins. The general tenor of the show is one of fun and escapade, but the major set-piece which everyone remembers most vividly—the weird adventures in the hidden temple and the suspense as the regiment marches toward certain doom—is tautly dramatic. The painful climb of the wounded Din to the pinnacle of the temple to sound his bugle and warn the regiment in the nick of time, is nerve-wracking, and Din's fall to his death is an unforgettably tragic moment.

The leading players were almost last-minute choices. They could hardly

Top, part of the temple interior, built on a sound stage. Center, the torture chamber of the temple with Abner Biberman, left, and Ciannelli demanding troop information from the three sergeants. Bottom, Thugs ambush the "Kilties" in the Alabama Hills.

Thugs and riderless horses flee the battle scene. Wranglers waited outside camera range to round up the frightened animals.

have been improved upon, even had Louis B. Mayer agreed to loan them Clark Gable, Spencer Tracy and Franchot Tone, as Hawks had hoped. Cary Grant, first offered the romantic role of Ballantine, wisely held out for the more humorous character of Cutter, a scatterbrained Cockney. Douglas Fairbanks Jr. took the less colorful Ballantine and gave the character a welcome touch of "class." Big Victor McLaglen, borrowed from Twentieth Century-Fox, got what proved to be his all-time favorite role as MacChesney, the hard-bitten but lovable leader of the three.

The only logical choice for Gunga Din seemed to be Sabu, the Indian youth who scored heavily in Robert Flaherty's ELEPHANT BOY (1937) and Alexander Korda's THE DRUM (1938). Korda would not loan Sabu, however, and tests were made of other actors, some of them Indians. Sam Jaffe, who had gained considerable attention for his portrayal of the High Lama in LOST HORIZON (1937), won the role, which proved a fine piece of casting against type. Emmy Stebbins was played by Joan Fontaine, who was not destined to receive a role worthy of her considerable talents until Alfred Hitchcock cast her in his first American film, REBECCA (1940). The prints currently shown are lacking a number of her scenes as well as *all* the scenes in which Cecil Kellaway appeared as her father.

Although the Sayre-Guiol screenplay had been okayed by the studio, Stevens didn't consider it ready at starting time. Consequently, he took the writers with him on location and they rewrote and polished many scenes as they were being set up.

Shortly after the Tantrapur Village setting was completed and dressed, a fire broke out. The crew brought it under control with wet burlap bags, a chemical truck and a water wagon. A full block of the village was destroyed along with thousands of props. Lloyd's of London paid off what was reported as the largest movie loss in 16 years. Thirty-one carpenters were rushed to the site from Los Angeles and rebuilt the damaged structures in 10 days. Freak windstorms caused further set damage.

During most of the shooting, which was scheduled for six weeks but eventually ran four weeks over, 325 actors and technical personnel lived at the site. A commissary staff of 37—chefs, bakers, waiters, dishwashers, janitors and maintenance men—took care of the preparation of some 14 tons of meat and vegetables that were trucked in from Los Angeles each week. About 15,000 lbs. of ice per week were brought in to keep the food refrigerated.

During the last two weeks the location party almost tripled in size, as some 1,200 extras arrived for the big battle scenes. Makeup expert Charles Gemora (better known as a portrayer of gorillas in innumerable horror pictures and serials) found trying to make up hundreds of extras as Indians a formidable task. He had a 55-gallon drum of brown makeup rigged with a

Continued on Page 958

William A. Fraker, ASC

By MARTHA GIES

"As a cinematographer you don't work for anybody but the director. You don't work for the producer, production manager, or anybody. Your loyalty and your love and hate and everything inside you, all your emotions, have to be for that director. Because he's the leader and you can only have one leader or you're not going to make a film."

Bill Fraker is addressing the 15th annual Film and Video Seminar of the Northwest, and his speech is rapid fire and passionate. In the audience are 500 film and video makers from all over the Pacific Northwest who gather annually to hear the best of the industry's artists and technicians and to share their own experiences with each other. Fraker, whose credits span 17 years during which time he's averaged two pictures a year, is one of the most popular speakers.

"The first picture in my resume, which is GAMES in 1965, was shot at Universal. It was my first feature as D.P.," says Fraker, remarking how unheard of it was in those days for Universal to allow a first-time cameraman to shoot a picture on their lot. "We had 15 days to shoot that picture.

"The picture I just finished, THE BEST LITTLE WHOREHOUSE IN TEXAS, is the only other time I've been back to Universal. I've worked mostly independent. This last picture took almost a full year, July to March. Eight months, nine months, that's what pictures are today."

On THE BEST LITTLE WHOREHOUSE, Fraker was working for the first time with Colin Higgins. "I thought he did a magnificent job," says Fraker who is always enthusiastic about his directors. "He is a very brilliant young man, Colin is, and his dialogue, his writing, is exquisite." Higgins shared a screenwriting credit with the authors of the stage play.

Like the athletes he loves, Fraker is a team player. He enjoys a reciprocity of support and respect with colleagues Conrad Hall, Vilmos Zsigmond and Laszlo Kovacs. He has worked as a camera operator for Hall, worked under Zsigmond on CLOSE ENCOUNTERS, and had Kovacs shoot two of the three features he has directed: A REFLECTION OF FEAR, 1973, and THE LEGEND OF THE LONE RANGER, 1980.

Fraker was recently asked to give his blessing to his camera operator of four years, Nicky McLean, who called to tell him he was leaving to shoot the new Hal Needham-Burt Reynolds picture. "Nicky says, 'What'll I do?'" Fraker recalls. "'Burt called me. What do you think, Billy?' And I said, 'God, you're so good. You're going to be so happy with them. You gotta go.' And he said, 'Okay. Thanks, Billy.'"

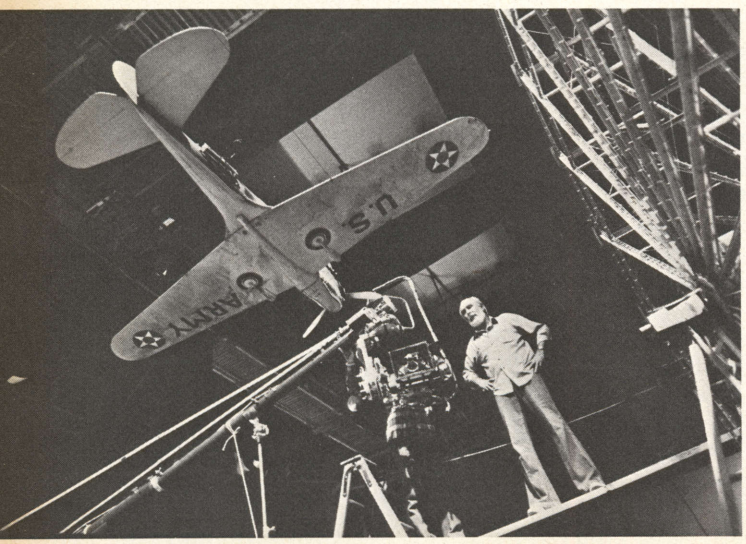
The rest of his crew he's kept together for nearly nine years. "We're a tight-knit group," Fraker says, and describes the relationship between himself and gaffer Doug Pentek as "extremely sensitive."

"Dougie and I—nobody ever sees us talking together. We talk all the time, but we do it with motions, and with looks. When we get to rehearsal, we go over to each other and we say, 'Back...front...through the window...' and make sure we can see the eyes. And that's it; we *know.* Because we've done it for so long."

A native of Los Angeles, Fraker enjoyed a very privileged film education at USC in the late 40's when Slavko Vorkapich was head of the cinema department, and Bundy Marton and Peter Ballbusch taught there.

Slavko Vorkapich had come to Hollywood from Yugoslavia and started out as screenwriter on the 1922 PRISONER OF ZENDA. He brought with him from Europe an interest in formal filmmaking techniques and an excitement about German expressionism. Collaborating with Robert Florey, he made THE LIFE AND DEATH OF

On the set of 1941, left, Fraker and the Louma Crane seem gigantic among Greg Jein's celebrated miniatures. Right, the many difficulties of photographing in heavy studio fog had to be overcome in the making of HEAVEN CAN WAIT.



CONDUCTS A SEMINAR IN SEATTLE

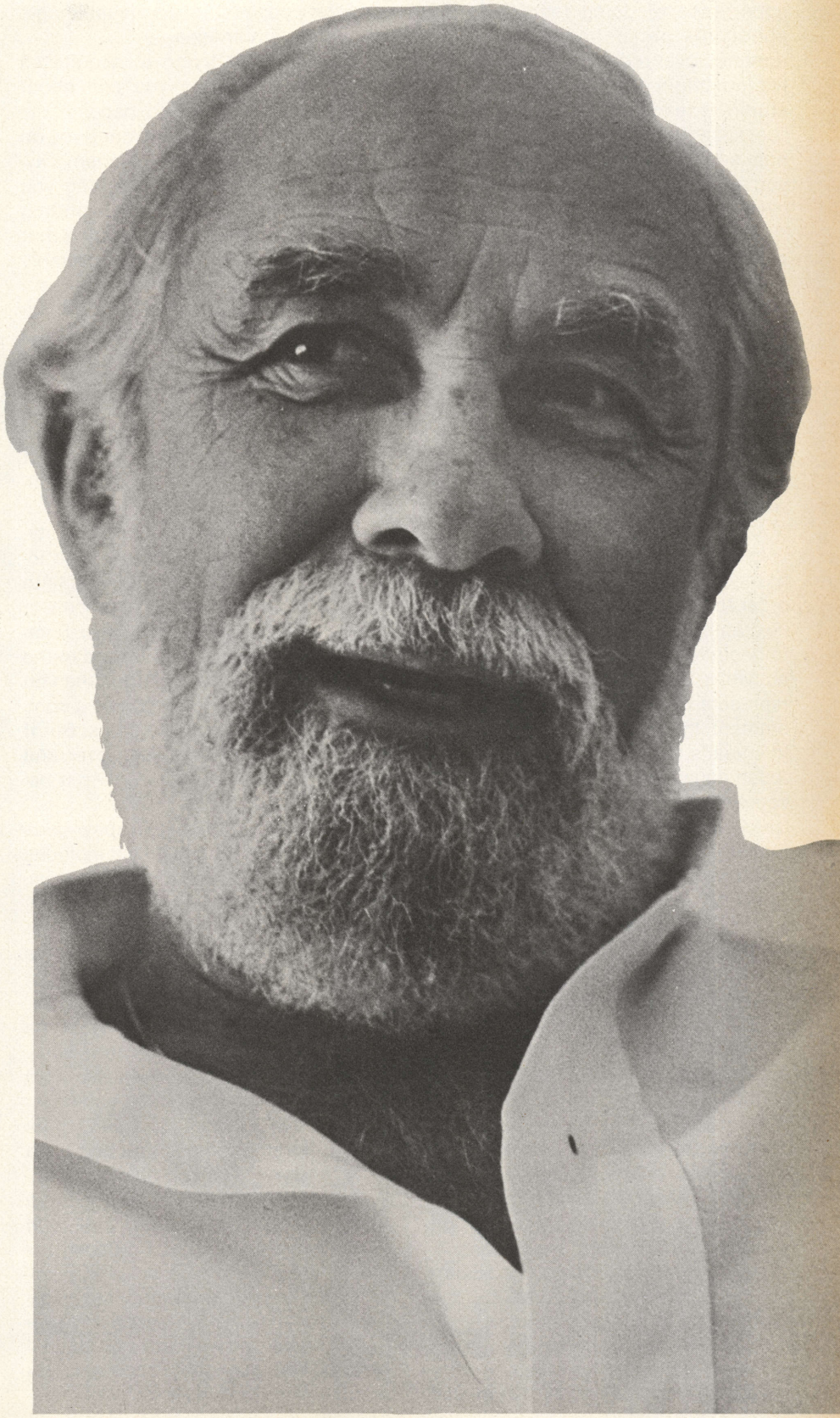
9413—A HOLLYWOOD EXTRA which shows the influence of the 1919 CALIGARI and which has since become part of the experimental film canon. In the 30's Vorkapich specialized in montage at MGM and it is for this contribution, the highly suggestive visual linkages used to condense time or heighten an emotional moment, that he is most famous. These sequences also represent an indulgence in nonlinear storytelling that is rare in American film.

"They began to lose the great departments they had before the war," Fraker says, "like the montage departments and the great 2nd unit departments that all the studios maintained. There were very few montages being made; montages were becoming a thing of the past because you had the realism of the pictures coming out of World War II, pictures like PAISA that Rossellini and those people did. And we began to lose the dissolve at that time, too; today you very rarely see a dissolve. Slavko's department was cut down and he was looking for work when they needed somebody to head the cinema department at USC. He'd already started a special class which was absolutely magnificent, so it was a natural move for him to go over there.

"That was probably the most exciting time that I can remember up to the present day. He was absolutely fascinating, and gave a marvelous introduction to cinema, I'll tell you. It was more the theory of how you should approach motion pictures, a formal interpretation, and you had to apply what he taught step by step.

"Laslo Benedek was another mentor—he directed Fredric March in DEATH OF A SALESMAN. And most of these guys came out of the cutting room. It's very interesting. If you wanted to take one class to learn about the cinema, I would say you take one year of film editing and you'd have a wider knowledge of cinema than any other course you could take. Film editing is extremely important. That's how I started. I quit film editing to come into the camera local."

Fraker has dedicated a lot of time to giving back to a younger generation the



things which he has learned. In addition to the Seattle seminar he has lectured widely – at Stanford, USC, UCLA, Long Beach State and AFI, and has taught a class at Sherwood Oaks.

There are three things he always emphasizes when he speaks, and in them is echoed his own formal training: the importance of doing tests before a shoot; his personal preference for romantic over realistic film looks; and his nostalgia for studio work. "The studio is exciting to me," he says, "because you're starting from zero. As opposed to going to a location where you're starting from point 45 or whatever."

Fraker also makes numerous civic contributions within the industry. He is a member of the Executive Board, International Photographer's Guild, Local 659, IATSE: a member of the Executive Committee, Cinematography Branch of the Academy of Motion Picture Arts and Sciences; he's on the Board of Governors of The American Society of Cinematographers and is twice a past president; and he serves on the Advisory Committee, President's Council of Long Beach State University.

In Seattle, when he learned he would have to cut his visit short by one day in order to attend a special 659 meeting, he grumbled a bit and said he really had to begin to cut back on some of these activities. But ten minutes later, when a representative of the Taiwanese government invited him to help present this year's Golden Horse Awards, the Asian equivalent of the Oscars, he accepted with the gusto that characterizes everything he does. "God," he effused. "I'd love to go."

In his talk at the Film & Video Seminar in Seattle [text appears below], Fraker discussed the directors he admires and some tough problems he's had to solve. The films he brought are three of which he is especially proud: all were nominated for Best Cinematography by the Academy, and one of them, 1941, also earned him a nomination for Best Visual Effects.

When Fraker talks, the excitement is contagious. Here his remarks have been edited only with an eye to eliminating those repetitions which, in his verbal speech, are an important part of that excitement, and to describing briefly for the reader the visual part of his presentation – the film clips, and the energetic gestures that are an indispensable part of his vocabulary:

• • •

Cinematography's a tough subject. I've been involved for quite a few years. I love it, I'm dedicated to it, and it's probably the most important thing in my life.

I look at making pictures as a group of people who get together and are dedicated and want to do something. The cinematographer's role is like that of writer – only he takes the written word and transposes it into a visual image; he writes with images.

You start out trying to acquire as much knowledge as you can about your tools. You have to become the master of those tools, and once you do that you can't worry about them anymore. The most important thing you have to concern yourself with is putting something on that screen, getting that image on the film. The tools you simply implement with. I have lost cameras, I have destroyed cameras – not willingly, but because I want that shot. And I will sacrifice a camera in order to get that shot, as we did on a picture called BULLITT in San Francisco. The shot is in the picutre and you'll see the Arriflex lying on the sidewalk up the street. But the shot was used. And it was magnificent.

A cinematographer's responsibility, number one, is to the people he's involved with, the director. Being able to shoot a picture and get an exposure is secondary. But also, you have a responsibility to the schedule and to the budget. If you make a picture and you go over budget and it becomes a commercial success, nobody cares. But if you do a picture that goes over and costs a lot of extra money, then it becomes a major, major problem.

I think that cinematography goes beyond what you think it is. It includes the responsibility of moving a crew, working with a crew, and the responsibility of a so-called marriage with a director. You have to practically live with a director. You have to find out what he's thinking about. When he says, "Yuh-no," you have to know he really means yes. You can't worry about his moods. You fight like cats and dogs for eight months, you never want to see each other again, three months later you meet, you hug each other, and you're off and running again.

I'm going to run portions of three films: HEAVEN CAN WAIT, 1941, and LOOKING FOR MR. GOODBAR. In these films there were specific problems for the cinematographer. We'll run a clip and then we'll stop and turn on the lights and we'll talk about it. I'll give you some anecdotes and also talk about how we solved certain problems, and then we'll go on to the next film. Let me start with the first part of HEAVEN CAN WAIT. This is where Warren Beatty first gets into heaven.

(Seven-minute clip of HEAVEN CAN WAIT, directed by Warren Beatty and Buck Henry, 1978. In this scene, Rams quarterback Joe Pendleton, played by Beatty, objects to his premature arrival in heaven.)

The reason I ran this part of the film was because of the horrendous problems we had in creating heaven. I guess God may have had the same problem.

We used a special effects man by the name of Bob McDonald who was the special effects man on the original HERE COMES MR JORDAN which was done at Columbia (1941), and photographed by Joe Walker. That was magnificent, beautiful black-and-white photography, by the way. One of my great joys as past president of American Society of Cinematographers was being able to sit down and meet the people that made these kinds of films. It gives you some place to go, something to strive for.

So Bob worked with us and recreated heaven again. One difference in the two films was that they shot HERE COMES MR. JORDAN in 18 days; we were shooting on this film for, I think, 6½ months. Another difference was we didn't know how to make it work with today's chemicals. The chemicals that they had used in those days, smoke bombs and so forth, are all outlawed today. So we were confronted with some different problems.

We built a steel grid that covered a complete sound stage. It was six feet high and it was, I think, 90 by 180 feet. Our idea was that if you were in heaven, you were above the sun, therefore, all the illumination should come from underneath. That was correct; the thing that was wrong, after we built the grid, was that we couldn't find lights that were powerful enough to go through the smoke. So we went back to the conventional idea and lit the top.

We used 1,500 pounds of dry ice in four different vats 27 times a day. We used mineral smoke that was vaporized by the old Navy destroyers. These destroyers used to have smoke machines on them. They would skirt the convoys and if there were a submarine alert they would run in and out laying smoke around all these ships, and in less than two minutes you couldn't find that convoy. Those are the smokers that we used. We'd take them off Navy destroyers and it would take us anywhere from 15 minutes to almost 40 minutes to smoke in that stage.

We had a white cyc around the whole grid. We had to balance the light that was falling on the smoke that was pumped in by the dry ice, create smoke in the background, and blend the look of the two so it looked like it was infinity. The dry ice would consume all the air, all the oxygen on the stage, so that in a matter of ten minutes you couldn't breathe. That doesn't mean too much, because when you can't breathe you open the door and you step outside. The only thing is, Warren works in such a way he will do 48, 50 takes of each scene, each set-up, over and over and over again. People are dropping off ladders, they're lost in the smoke. This sequence took us almost four weeks to do, the little piece you just saw.

(Two-minute clip, HEAVEN CAN WAIT: Joe Pendleton now in the body of his former rival, the first-string quarterback for the Rams, plays in the Superbowl.)

I show this sequence because there are horrendous logistics and organization problems shooting a sequence during a regular Rams and San Diego Chargers game at the Los Angeles Coliseum. This was shot at halftime. We had rehearsed the football players for four days. All these guys were ex-football players and they're just huge and... marvelous people. They're too big to say anything else.

We were shooting the picture in a mansion in Palo Alto, just outside of San Francisco, and at five o'clock on a Friday or Saturday night, whenever the game was, we took the key people down in a plane to watch the football game, and then came back to Palo Alto that same night.

We scrutinized every inch of the coliseum. I'd attended the coliseum 500,000 times, but I'd never been on the floor. The football field is built like this (on a slope) so that when it rains, the water drains off fast. But you don't realize that until you get on one side of the field to shoot across the field and they say, "I want a long shot," and you find the guy has no legs.

We also stole some shots every time we went down there. We always took a couple of cameras with us to take tests and find out how the lights were and what kind of an exposure we'd have to be dealing with. Also, we were using zoom lenses and our zoom lenses started at f/4, so I happened to have pushed all this footage one stop.

We set up and we got them while the football game was going on. Warren was magnificent. You've got 60,000 people there—it was the last game—and it's that rival game between Los Angeles and San Diego, so it was jammed. Sixty-thousand people and we could only do it once. And Warren can't make a mistake, so he said, "Don't worry, Billy, we're going to do it."

We set up, got all our equipment there, all the people there, and at halftime they said, "You're on." We went out and did it, we did everything we had to do on that football field in 15 minutes, got the shot, and got off. I don't know why it went so well, why it was so easy, but I think it was maybe because of the organization and the people we picked.

After we finished, Warren and I were on the field all by ourselves. The whole coliseum was empty and only Warren and I were there, talking about what we could have done and what we didn't do, and what we should have done and so forth, and I said, "Well, we'll find out Monday morning," and he said, "Why? Do you think anything is wrong?" And I said, "No. It worked out beautifully and I think you'll be very happy, and I think we'll have enough. It'll print in the middle of the scale, so we can move it any place we want to when we time the picture because we'll have enough density, because I pushed it a stop."

Well, he doesn't understand. He went white. And he said, "You pushed it a *stop?* What do you mean, you pushed it a stop?"

I said, "Well, just to make sure that I had a thick, fat negative." The original plan was to do some opticals here, and I said, "I just want it fat enough so we can move it any place we want to move."

And he didn't understand it at all and he became paranoid and he said, "My God, we can't come back and..." And he and I got into a major confrontation right there. Just the two of us, like one gladiator and one old man in the middle of the coliseum, an empty coliseum! That's Saturday night.

So I went home and had a couple of drinks and everything's marvelous, and I woke up Sunday morning and I started thinking, "Well, how can that film be bad?" So he'd dropped the seed, right? And I tell you, it started to work. So now I'm getting a little—not nervous—but I'm concerned. And boy, I'll tell you, at five o'clock in the morning, I'm at that lab. "Open the door! Let me in! What's

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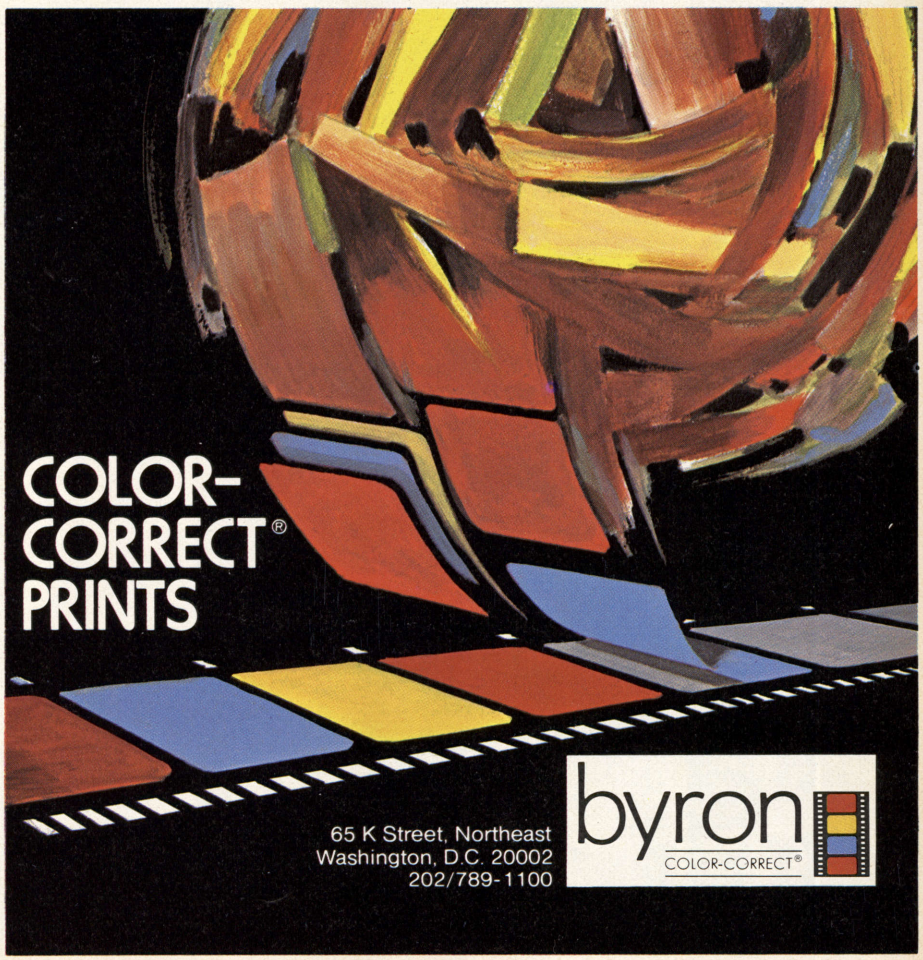
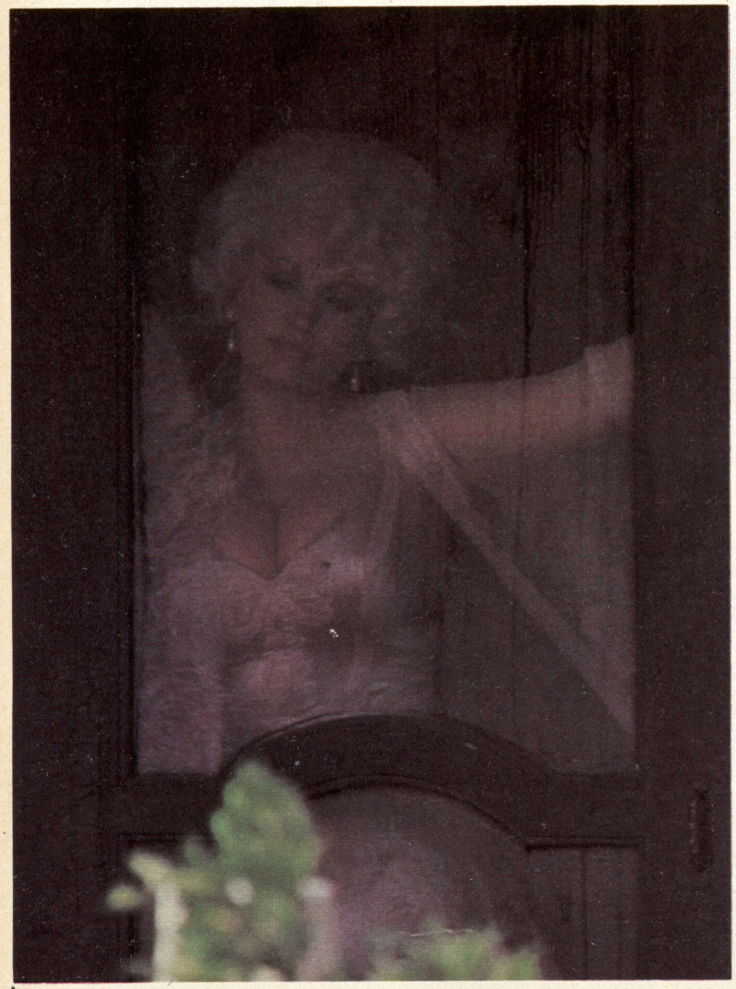


DESIGNING

THE BEST LITTLE WHOREHOUSE IN TEXAS

By GEORGE E. TURNER

Casting Dolly Parton as Miss Mona, the proprietress of the legendary "chicken ranch," was the first step in the evolution of the design for the film from the look of the stage play.



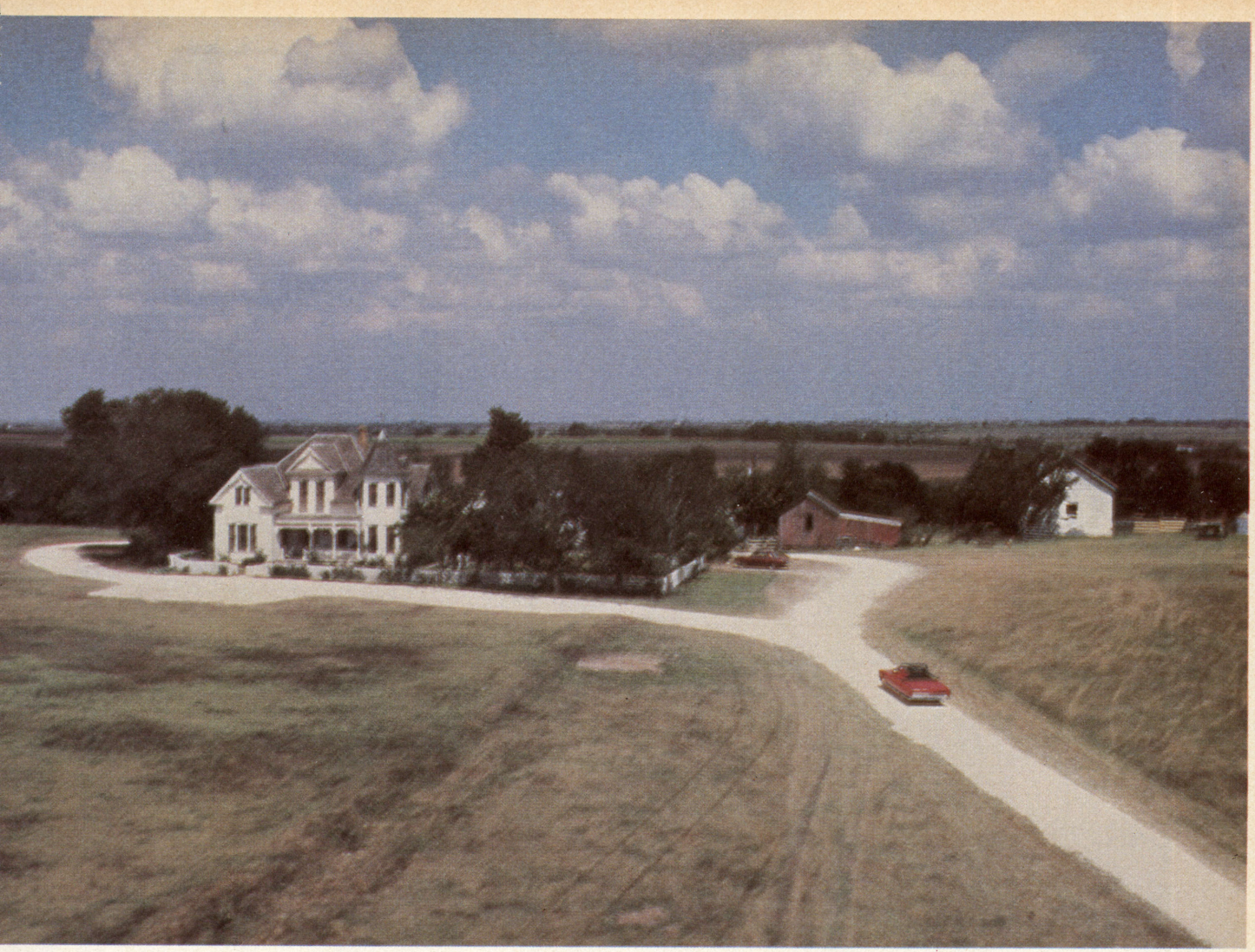
Photos by ROBBIE ROBINSON

It's very easy to watch THE BEST LITTLE WHOREHOUSE IN TEXAS, for many reasons. It has glamorous stars (Burt Reynolds, Dolly Parton), nifty comedy performances (Dom DeLuise, Charles Durning, Jim Nabors, Noah Beery), hordes of dancers and plenty of music.

It is also an exceptionally well designed picture, a fact most moviegoers appreciate without actually realizing it.

Freely adapted from a Broadway musical comedy, which in turn was even more freely adapted from a true story, it tells of a certain Texas farm home which flourished as a sporting house for some 60 years. Known as the Chicken Ranch because so many chickens were accepted in lieu of cash during the Great Depression, it was a well-known institution until a political scandal brought about its demise.

As always, the "look" of the movie is the product of many contributions. Most importantly it reflects the taste,



(ABOVE) The actual house for the chicken ranch was photographed only from the front and the back of the house was redesigned as a set in order to facilitate the dance number (BELOW) which takes place when the Texas A & M Aggies visit Miss Mona's for a victory celebration. Initial plans called for the dance to take place in the parlor, but it was moved to the backyard so that the interior of the house did not need to be so open.

vision and skills of the director, Colin Higgins, production designer Robert F. Boyle, and director of photography William F. Fraker, ASC. It was the responsibility of these three not only to impart the combination of reality and fantasy necessary to a musical comedy based upon a true story, but to impart a visual unity to juxtaposed location and studio photography.

Most of the exteriors were filmed in Texas. Practical exterior settings included the historic state capitol building in Austin, the Lavaca County Courthouse in Hallettsville, the small town of Hallettsville, a beautiful old farm house near Pflugerville (the movie version of the Chicken Ranch), and a small country home representing the bachelor quarters of Burt Reynolds. The spectacular interior of the capitol also was utilized for the first time in a feature production. All interiors, except part of those in the capitol building and a small cafe built in an empty store building in Hallettsville, were built on Universal sound-

stages. The front of the Chicken Ranch was duplicated at the studio, as was a back yard setting that does not exist at the actual location.

Higgins, who was born in New Caledonia and grew up in Australia, was an actor, soldier and merchant seaman before settling down to attend film school at UCLA. While still in his

Other dance numbers for the film include (ABOVE LEFT) a protest in the lobby of the capitol building, (ABOVE RIGHT) a solo routine by Charles Durning as the governor, involving trick camera work, (LEFT) a television show in which Melvin (Dom DeLouise) alerts the citizens to the existence of the chicken ranch and (BELOW) the Aggie's victory celebration which starts in the locker room of the stadium and continues through their trip to the ranch.

thirties he wrote HAROLD AND MAUDE (1971) and SILVER STREAK (1976), then wrote and directed FOUL PLAY (1978) and NINE TO FIVE (1981). He is a quiet, pleasant individual who believes in extensive preproduction planning on any film.

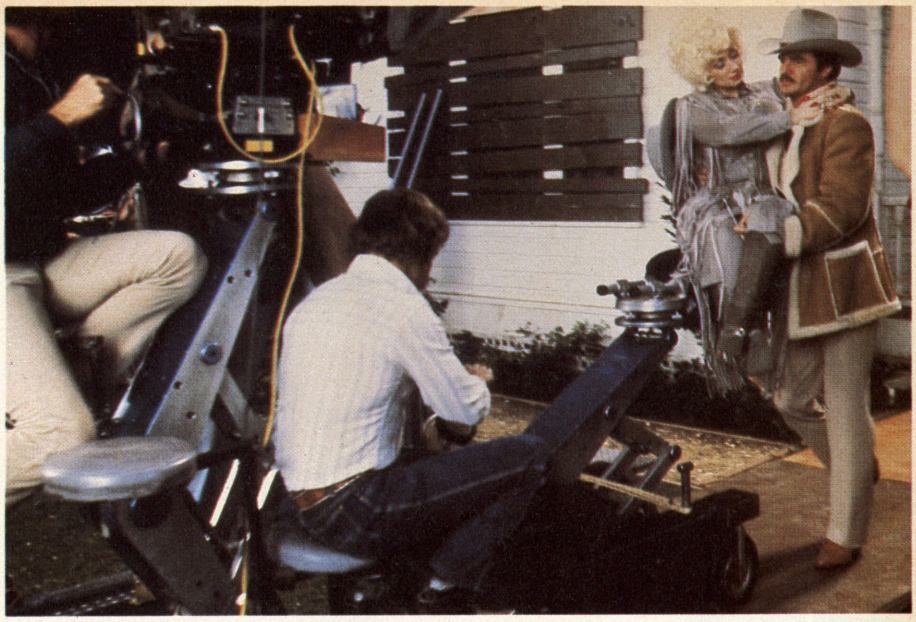
"The general tone I wanted for the picture was a bright, clean look, as pretty and attractive as possible," Higgins explains. "I had sort of vague, general notions like bright and colorful and some feeling of what I wanted regarding the personality of the house. I'd talk these vague things over with Bob Boyle, the production designer, and Theadora Van Runkle, the costume designer, and they'd go off and come back with the concepts."

Boyle, the white-haired, craggy-featured veteran of scores of major films spanning a half-century, is one of the finest production designers in Hollywood. He assisted some of the leading art directors at Paramount as a draftsman, production illustrator, and assistant art director. He became a full-fledged art director on a Universal serial, DON WINSLOW OF THE NAVY, then was "kicked upstairs" to design Alfred Hitchcock's SABOTEUR (1942), an extremely difficult but rewarding assignment which led to other Hitchcock films: SHADOW OF A DOUBT (1943), NORTH BY NORTHWEST (1959), THE BIRDS (1963), and MARNIE (1964). Boyle has worked for all the major studios. He was also a combat cameraman during World War II. Boyle explains the term "production designer":

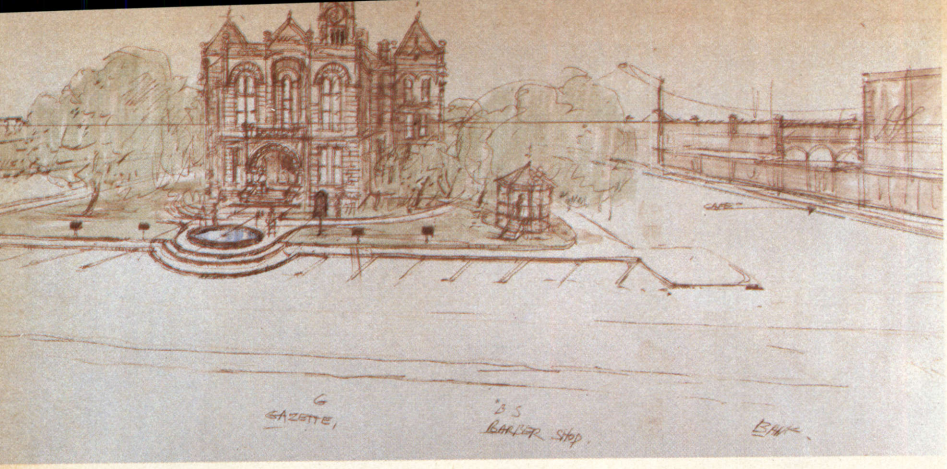
"It all started with GONE WITH THE WIND. William Cameron Menzies was working in a special capacity, designing the film overall, and there was already an art director, Lyle Wheeler. Selznick didn't know what to call Menzies in the credits, so he invented the title that has plagued us ever since."

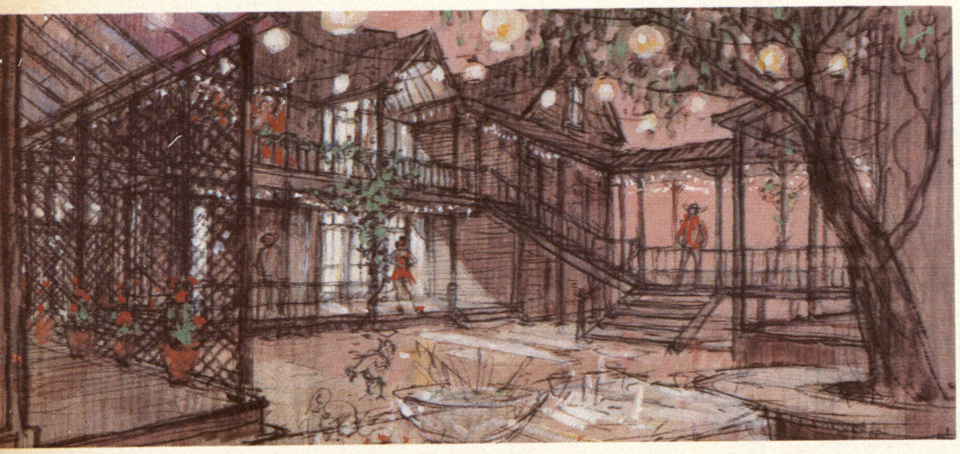
Boyle was on THE BEST LITTLE WHOREHOUSE IN TEXAS for nearly a year. "The production designer is called in very early because we have to establish locations, style, the tone of the film.

"Then I met with Colin and enjoyed talking with this very quiet-spoken man, and I enjoyed the many others who were involved. It was, I would say, a producer-heavy film, but then every picture I've worked on in the past three or four years is heavy with producers. I set to work with great



(ABOVE) Burt carries Dolly from the house with the help of another dolly. (BELOW) The courthouse in Hallettsville built in 1896 with an artificial circular fountain added in front in order to permit the Sheriff to give Melvin a dunking.





enthusiasm, which I felt all the way through the film.''

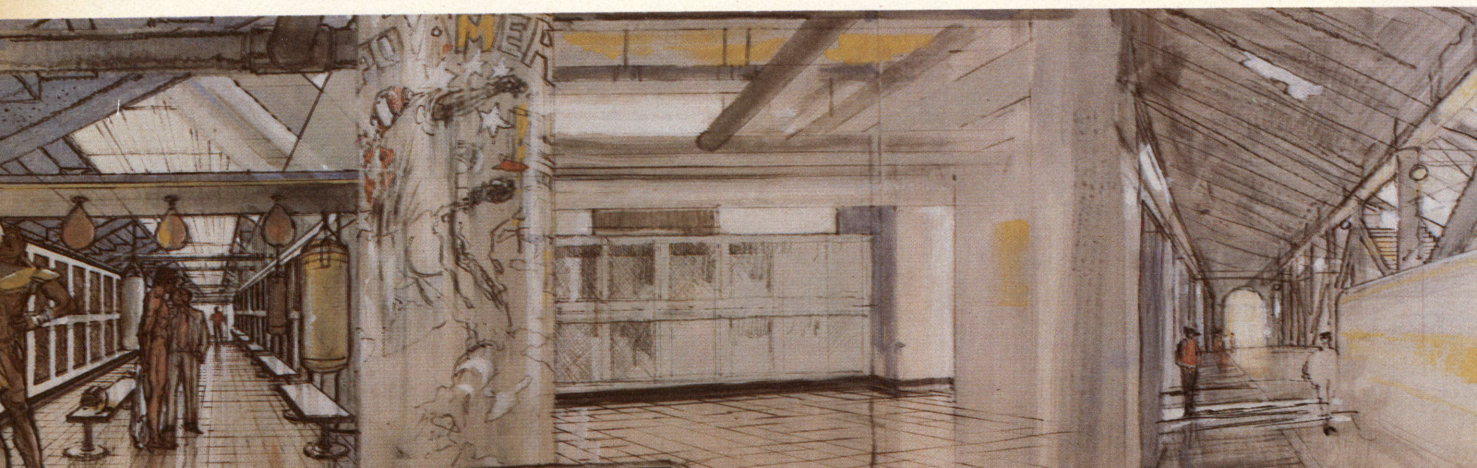
It was decided from the outset that part of BLWIT, exteriors for the most part, would be filmed on location in the Austin, Texas area. The interiors and some of the exteriors would be done on sound stages at Universal.

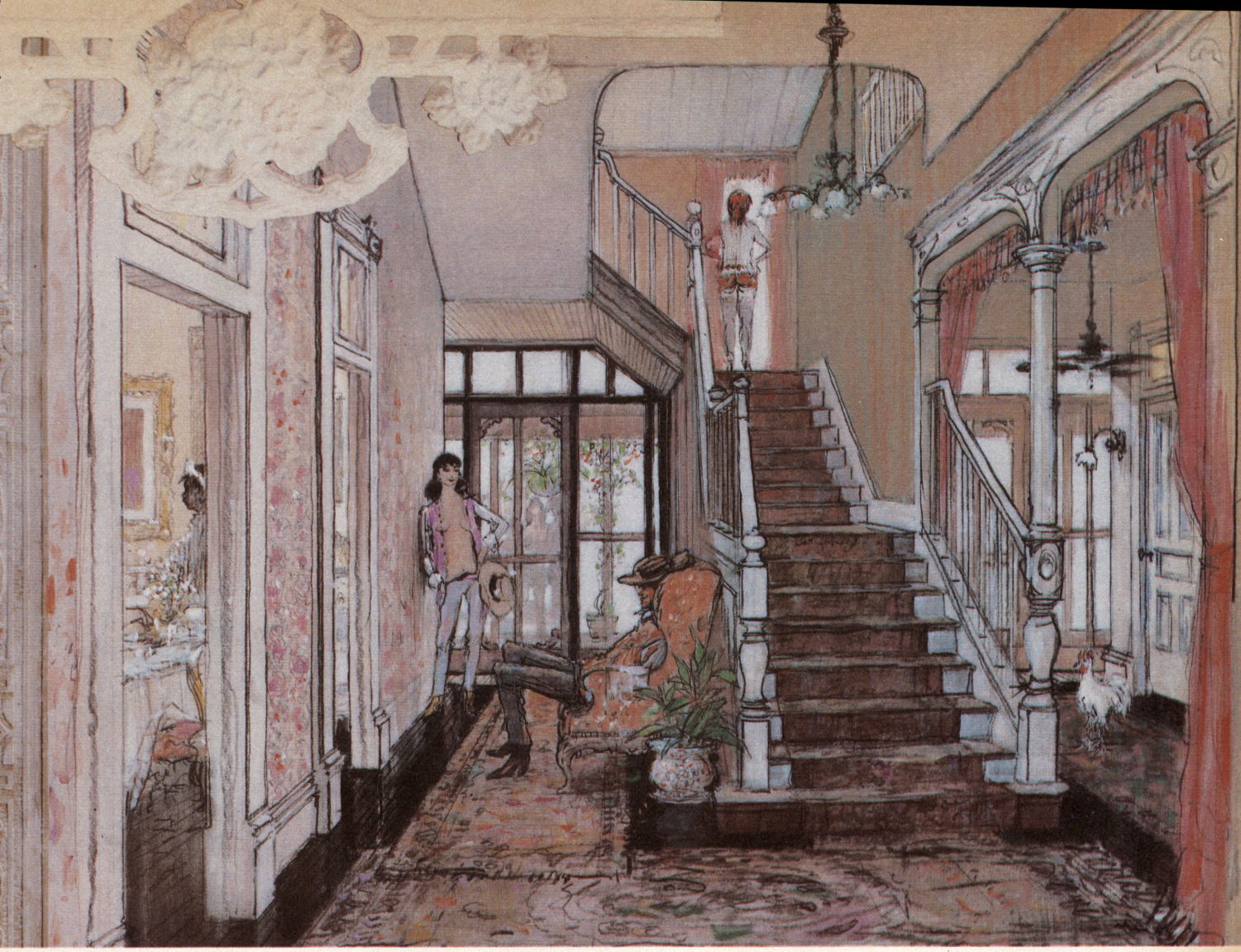
''So we were off and running,'' Boyle says. ''We went on a reconnaissance to Texas where I found out—and all of this was being revealed to me piecemeal—that there had been a previous start on the picture. Universal had started it with Tommy Tune, who did the stage show, as director, and for reasons I have never been able to find out, they abandoned that project.''

''Some work had been done by the previous producers before we started,'' Higgins says. ''The biggest contribution they made was that they had picked the house, the Chicken Ranch. When I came in they were gone, but they had planned to shoot basically the way we did, to shoot the exteriors in Texas and come back to Universal for the interiors. They had picked the house and the town. Henry Bumstead was their production designer and he had already started putting up a totally different interior to that house. They gutted the interior and made a much more open dance area with railings around it and I didn't like that and neither did Bob Boyle.''

Boyle adds that he at first found no quarrel with the original concept of the film. ''When I read the script and talked to Colin and developed my own

Paintings by production illustrator Joseph Hurley show the courthouse with fountain added (TOP); the Chicken Ranch to be reproduced on Stage 12 at Universal; the back yard, actually an interior set; and (BELOW) the musical-comedy version of the Texas A & M locker room.





A gorgeous piece of "Swiss cheese": the interior of the ranch house.

feelings on it I changed it. I saw no point in being too radical. As a newcomer to a project you may well say, 'to hell with that,' but when I went down to Texas—and I had worked in that part of Texas before on LEADBELLY, so I knew the area around Austin well—and when I saw this house, I thought it was a very good selection. They had a few areas from the front stored on the backlot and I used them."

Higgins says that "Bob went in and totally designed the interior to make it more homey and more like a regular house that had lots of rooms. He said something to me which I'll always remember: 'A set should be like a Swiss cheese in which you have all sorts of holes and things to be able to look at, nothing flat at all, with spaces opening up all over.' I'd never worked with him before, but he was a big guy who did a lot of Hitchcock films so I was really happy to get him, to work with him and see how things developed."

Boyle, who acknowledges the pioneer art director Hans Dreier as the author of the "Swiss cheese" theory, says the set changes were necessitated largely because they were locked into a somewhat realistic approach inasmuch as they planned to use the real state capitol building and a real town. "We couldn't really have a very 'theatrical' presentation from a set standpoint; we had to stick to reality. The house was owned by a Mr. and Mrs. Murchison and it was built around 1890 by her grandfather. We had to make certain additions, such as the time changes when it went from 1910 right up to the late Seventies, when the place was closed down.

"I've been asked why we didn't use the original Chicken Ranch. It was a one-story, rambling thing that kept being added to. Since we needed stairs we wanted a two-story house, which gave the girls a chance to come out and dance down the stairs. The original concept was to have the big Aggie dance inside the house, but I felt that if we did that we'd have to make it like a stage play, and since nothing else we were doing was like a play I thought, 'Why can't we just have the Aggies flow through the house almost like water,' so we made a central stair and a way for them to flow around the stair and through, and then we'd have the big dance in the back yard.

Higgins concurred with Boyle's "flow through" concept. "The other version looked like a hotel lobby," he says. "It was terrific when you had people dancing in it, but what happens when you just have people walking in and out? By taking them through and letting them dance in the back yard the house could still have

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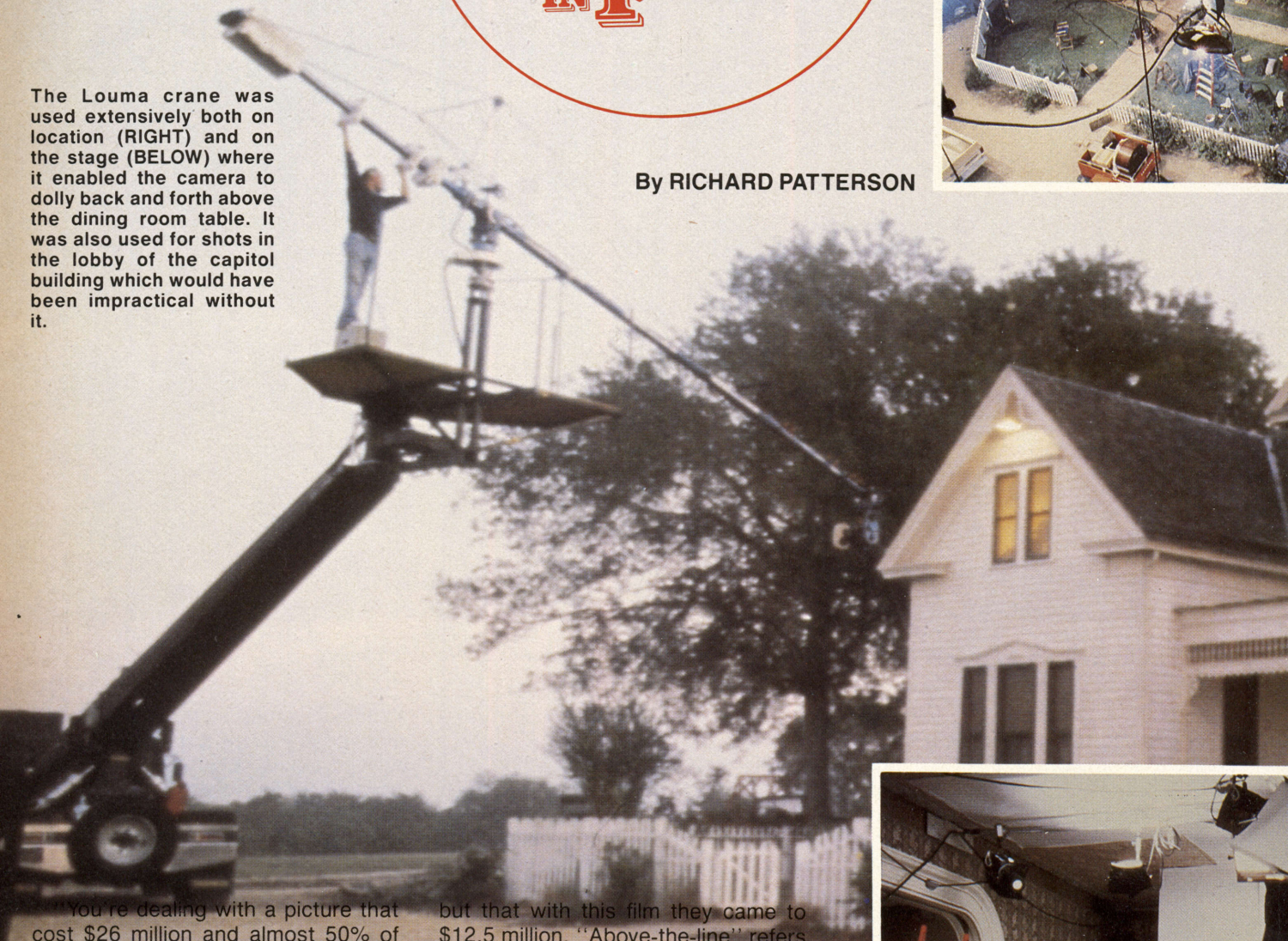
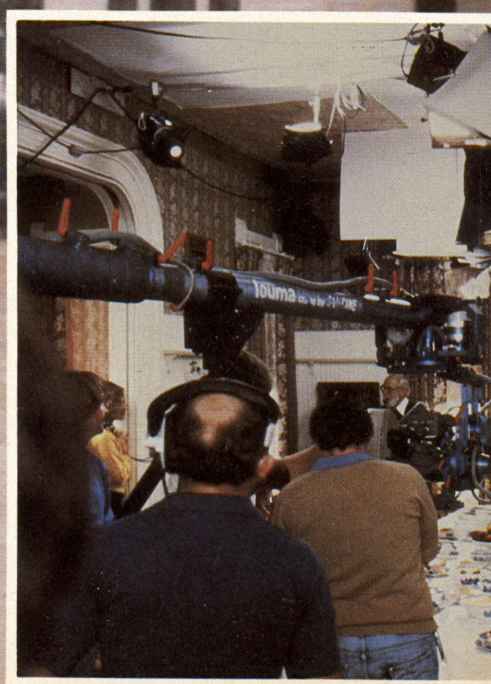
PRODUCTION MANAGEMENT FOR THE BEST LITTLE WHOREHOUSE IN TEXAS

WHY IT COST $26,000,000

The Louma crane was used extensively both on location (RIGHT) and on the stage (BELOW) where it enabled the camera to dolly back and forth above the dining room table. It was also used for shots in the lobby of the capitol building which would have been impractical without it.

By RICHARD PATTERSON





"You're dealing with a picture that cost $26 million and almost 50% of the cost is above-the-line. Just chop that off. Imagine that that isn't there. All of a sudden you've made this picture for $13 million. That's a very attractive price for the film considering that it is a musical."

Peter Macgregor-Scott, co-producer and production manager for THE BEST LITTLE WHOREHOUSE IN TEXAS, is discussing some of the unusual aspects of the budget for the film. He says that normally the above-the-line costs are likely to represent 30% of the total budget for a movie, but that with this film they came to $12.5 million. "Above-the-line" refers to a traditional division in motion picture budget forms between certain costs for talent or rights and the remainder of the direct costs involved in producing the picture. Above-the-line costs include rights to the story, screenwriting fees, producer, director and cast. From a production management point of view it is primarily the below-the-line costs which can be analyzed, but it is helpful to review some of the factors contributing to the unusually large above-the-line costs on BLWIT.

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The entire chicken ranch house was duplicated on the stage in a two story set.

(TOP) Reynolds and Lois Nettleton in Dulcie Mae's coffee shop, the only location interior used beside the capitol building. (CENTER) Higgins, Parton and Jim Nabors take time out to view a playback on the video monitor. (BOTTOM) This setup for a tracking crane shot was for a song by Reynolds which was eventually cut from the film.

SPECIAL EFFECTS FOR FIREFOX

By JOHN DYKSTRA, ROGER DORNEY, GRANT McCUNE
JOHN SULLIVAN, MAT BECK & DON TRUMBULL

OVERVIEW

By JOHN DYKSTRA

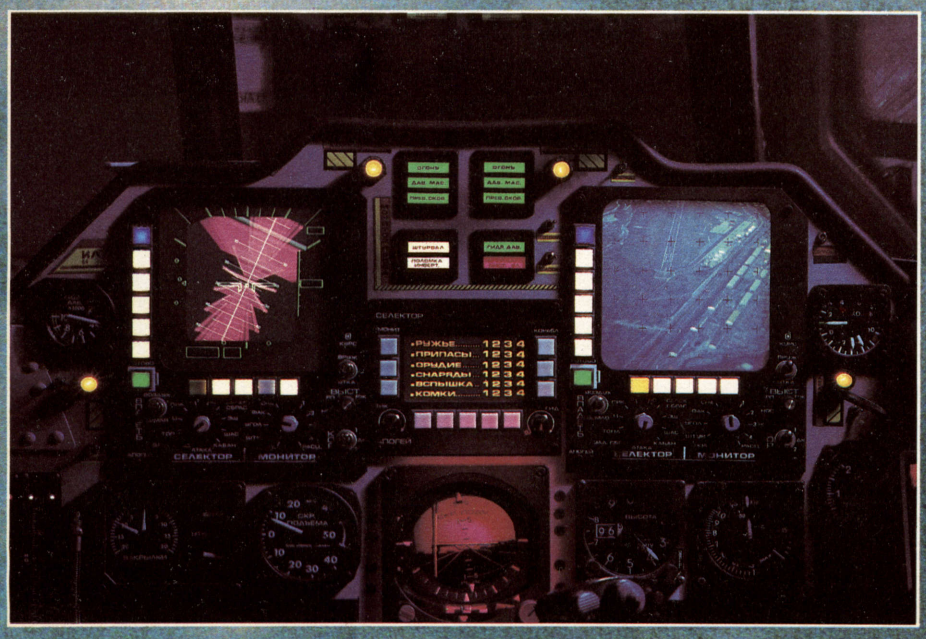
FIREFOX presented Apogee with an opportunity to put to use some very new techniques and to take advantage of some talents that have been our type cast for quite awhile. We asked Clint Eastwood what the Firefox wanted to be and do as a story telling tool. His characteristically spare requests were also charactistically to the point: A plane that looks fast standing still. A black finish, polished to a metallic gloss. A prop that, in the telling of the story, he could scramble into, fire up and taxi out of a hangar in Europe and then later on, across an ice floe in the far north. A machine that when performing in the air, would impress experienced military observers with its speed and maneuverability. Lastly, our view from inside this plane should give the audience the special mix of exhilaration and fear reserved for pilots who push the limits hard enough to tear the wings off!

Our first approach to providing the hardware and experimental challenges, was based on the traditional time and money limitation: outlining the needs carefully, establishing the priorities and balance of each of the components relative to the total. We worked up this pile of paper and storyboards that represented estimates, projected times and best guesses at techniques. Appropriately humbled by the specifics, we strategically withdrew to the realm of glowing generalities and anxiously set about our work. Because of the inexorable march of time, virtually all of our solutions would have to develop concurrently. As models are an integral part of whatever final product went into the film, I'll start with them first:

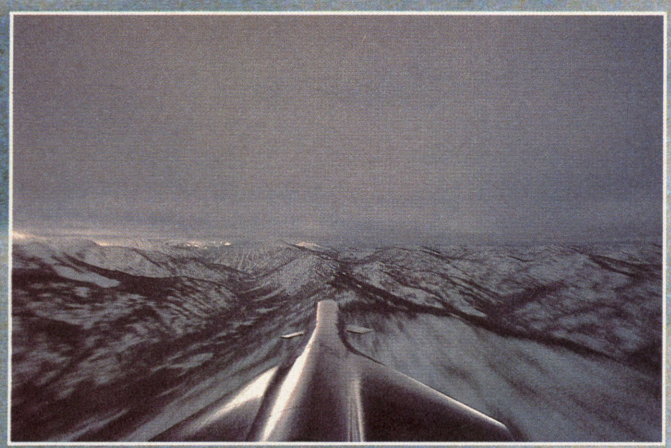
Simple solutions often being the most inelegant, we decided that flying models might be a quick and believable solution to the difficult problem of our nonexistent hardware. Our first model, the Firefox, had to take off from a Russian runway and later land on and take off from an arctic ice floe. Our second model, the Russian hunter killer helicopter, needed to be seen in pursuit of our hero across the arctic waste. There was no plane to be dressed as a "Firefox" and our full scale mockup couldn't fly. Also, unfortunately, there were not Russian helicopters for hire. The radio controlled helicopters were pretty much off the shelf with some add-on dressing and detail. They were proven flying models, although I still don't know how our R.C helicopter pilots mastered the rub-your-stomach, pat-your-head and tap dance control functions under 50 pounds of Greenland clothing. The Firefox, on the other hand, was an artist's concept of a cross between S.R.-71 and a B-1 bomber. It satisfied the fast standing-still requirement but a few measurements and a couple of calculations showed it to have slightly more lift and slightly less stability than a brick. Before continuing however, one must remember there are numerous factors affecting the course of events. The month was February and in April we would be tracking off to Thule, Greenland to shoot our arctic scenes. We needed taxiing on ice and hoped to get some landing and take-off shots on a floe. April was locked-in, as Greenland's winter, with its 100 mph winds and its minus 30 degree cold, and most important its 24 hour night, would not wait a single day for us. We had also discovered that our full size Firefox mock-up, 60 feet by 40 feet, would cost nearly a quarter of a million to ship to our location.

We weighed this against the value of a real looking, flying, landing plane in the Arctic, and set out to prove that with enough power even a brick can fly. With the radio controlled aircraft completed, both the helicopters and the Firefox in a variety of configurations we set off for Greenland. The specifics of the models and their performance in Greenland, was a 50/50 situation. The helicopters proved to be very effective and photograph well. The Firefox itself flew off the runway at Thule Airbase, but was unwieldy on the ground. On the rough, snow covered ice it could not attain enough speed to take off. Dick Alexander was in charge of special camera construction and maintenance, and handled the preparation

The interior of the Firefox cockpit included a rear screen projection and computer controlled instruments.

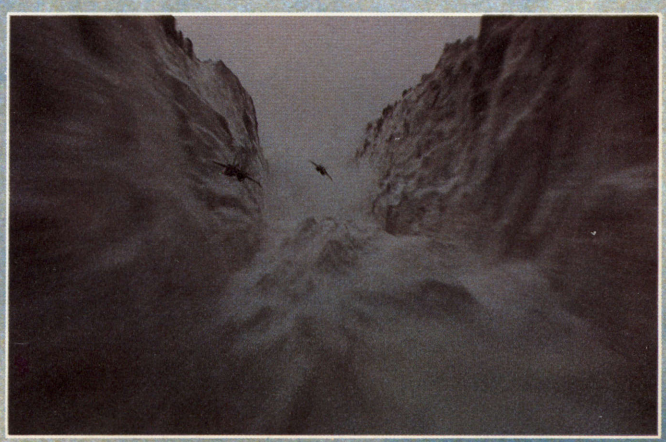


A large miniature mountain with trees, snow and explosive charges was shot in the Apogee parking lot and composited with a 2 ft. model with matching moves.

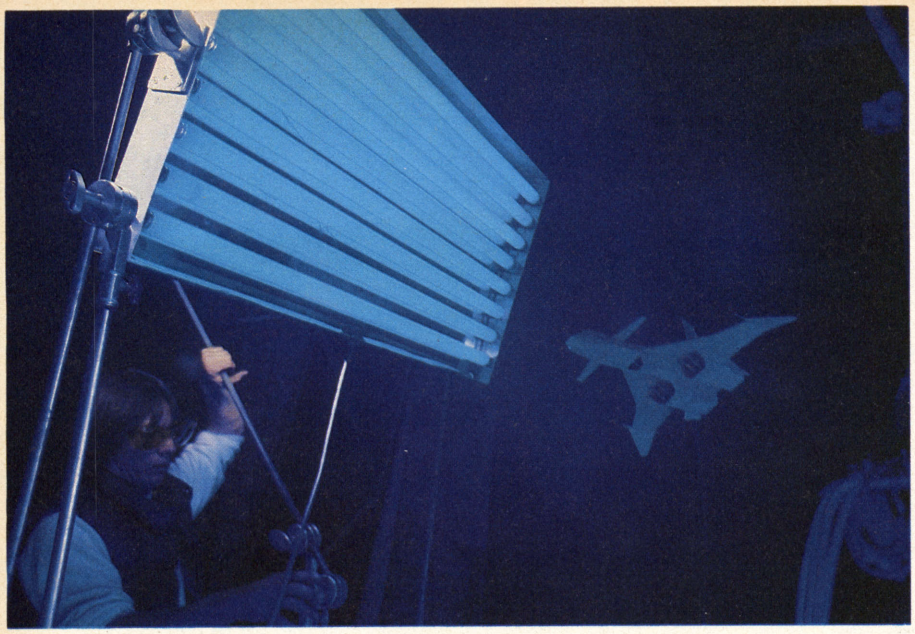


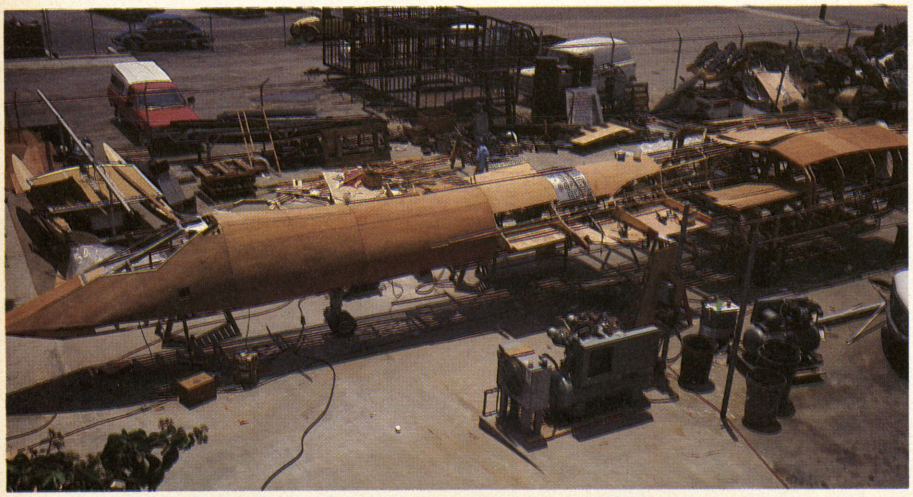
A 5 ft. model shot on the Apogee stage composited over background footage from a Lear jet over Idaho.

The ice trench miniature was photographed at Apogee with timed explosives and the two model planes were shot separately, matching the motion of the camera moves in the background shot.



These shots of the Firefox are reproduced from VistaVision composites. This background was shot in a Lear jet over the Gulf of Mexico and composited with a blue screen shot of the 5 ft. model. Internal Navigation System data from the background photography was used to help program the model photography.





(TOP) Ultraviolet light was used for the matte pass on the model in the "reverse blue screen" process. (CENTER) The ice trench background was filmed with Apogee's high speed motion control boom camera. Since the shots included explosion effects they could not be filmed via the usual long exposure motion control. (BELOW) The full scale version of the Firefox constructed at Apogee was powered by a VW engine and could taxi at 30 mph.

of those camera systems used throughout the filming. We work in the VistaVision format for most of our feature film work, so our camera compliment for the Thule location included two VistaVision butterfly cameras. One of these cameras was prepared to be used on a motion control head for photography on the ice, providing us pan, tilt, and locked-off backgrounds over which to matte models later. That same camera operated in the function of a nose camera in the Lear jet which we used to fly low over the water, low through the fijords, and low over the air base on occasion. This photography was then converted to background plates for those sequences in the dog fight involving the Greenland scenery. We also used the Continental Camera systems probe lens out the bottom of Clay Lacy's Lear jet, feeding a VistaVision Butterfly camera. The photographic systems in the plane had many complex components, specifically the nose camera and the interior probe lens camera. Both of these incorporated an exposure compensation device, a synchro motor connected via backlash free gearing to the lens iris. The electronics then compared and balanced speed versus f/stop, allowing us to change camera speed from ½ a frame per second to 24 frames per second—without being able to see any exposure fluctuation in the final result. This required that Dick prepare these cameras and motion control heads in a very specific way. Besides the cold weather grease ritual for the cameras, many of the special "one off" mechanical components had to be literally frozen and then operated at low temperatures to determine exact machine tolerance requirements. Not only did Dick have some special prep, but our electronics people had to replace many of the components in our motion control devices and camera controllers with devices which were guaranteed to cold weather specifications. And as usual, any kind of extreme of weather puts sophisticated devices in their worst mood. We replaced the majority of the cables and other connecting devices on the cameras and camera controllers with low temperature, "special duty" wire. These camera systems and motion control devices traveled with us not only to Greenland, but also to Europe, and performed beautifully during the entire time.

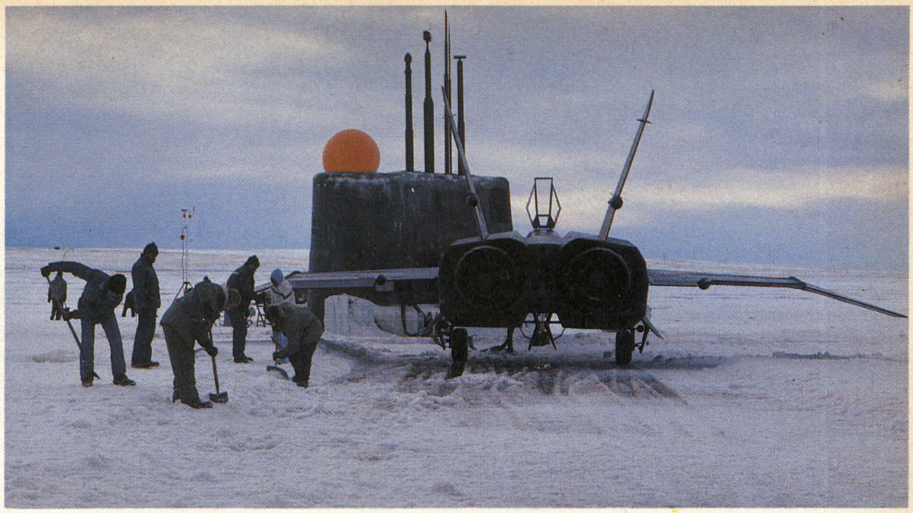
One of the particular photographic

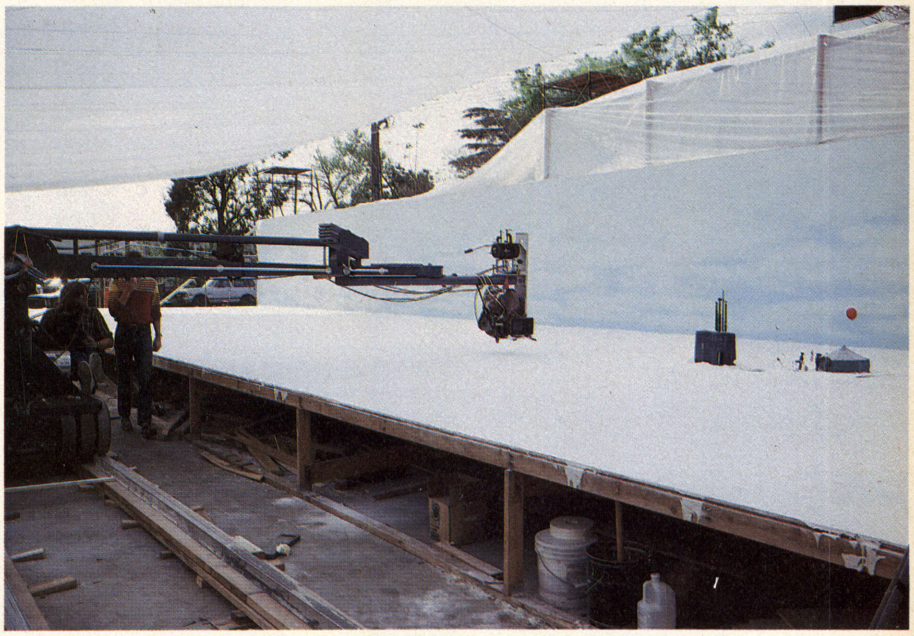
problems we had to address ourselves to in this film was that the ship was to be shiny. We had been developing a matting system which had allowed us to shoot shiny ships, but we hadn't perfected it when we started "Firefox." Due to time requirements we started out using conventional blue screen, or transmission screen, matting technique that we'd used before. The highly reflective ship surface was not particularly helpful in producing good blue screen mattes. The blue screen behind the ship would be brightly reflected in all of its surfaces. Each of those reflections would act just like the blue backing and result in matte that was full of "windows," or holes. With a great deal of labor these could be hand painted or rotoscoped, but the labor costs and the time needed for the number of shots to be done was prohibitive. Also, the ship moved very quickly in all these action sequences, causing the image to streak, have a transparent smear on the leading and trailing edges. This streak was particularly a problem, because we were compositing these ships with a high key, or bright, background. In this situation, any matte misfit, or density imbalance would cause a matte line. (Discussion of this matte technique is addressed in Roger Dorney's segment on the optical combination.)

The specific demands of the action in this film were that we make it look like the film that we've all seen of actual airliners flying through cloud adorned skies, photographed in many cases by Clay Lacy's Lear, and Continental camera. These shots, with their actual planes and backgrounds, their aerial perspective, their reflections, their motions, and their sense of moving camera platform, were great yardsticks. To duplicate their look required that we have a flexible camera platform, able to follow action with pans, and able to be a "camera ship" in terms of following our prey through rolls, loops and various maneuvers not likely to be the venue of commercial airliners.

The technique we have used in the past to achieve the "dogfight" performance in "space" was to shoot the move of the space craft first. This move could then be massaged into whatever formation or maneuver that showed the model in its best light. With the ship's move in the can we then would shoot a planet or star background to "match" the ship. Be-

Continued on Page 920





(TOP) A full scale set for the Arctic ice floe scene was shot on location in Idaho. (CENTER) A miniature version of the same set was shot at Apogee. (BELOW) The miniature radio-controlled Russian helicopter about to explode after taking off from the deck of the Russian ship.

REVERSE BLUE SCREEN

By JONATHAN ERLAND

The advent of the recent wave of motion picture special effects films, and the growing sophistication of the audience that the genre enjoys, has put an enormous strain on current travelling matte technique. Readers of AMERICAN CINEMATOGRAPHER will recall recent discussion of the subject by David Samuelson in his column, "Talking Technically" (May and June 1982). Also in the literature is a comprehensive survey by Walter Beyer (Journal of S.M.P.T.E., March 1965, Vol. 74, No. 3 pp. 217–236), and Raymond Fielding's excellent book, "The Technique of Special Effects Cinematography" (Hastings House, 1968). There have been some nineteen patents issued in connection with this one facet of cinematography.

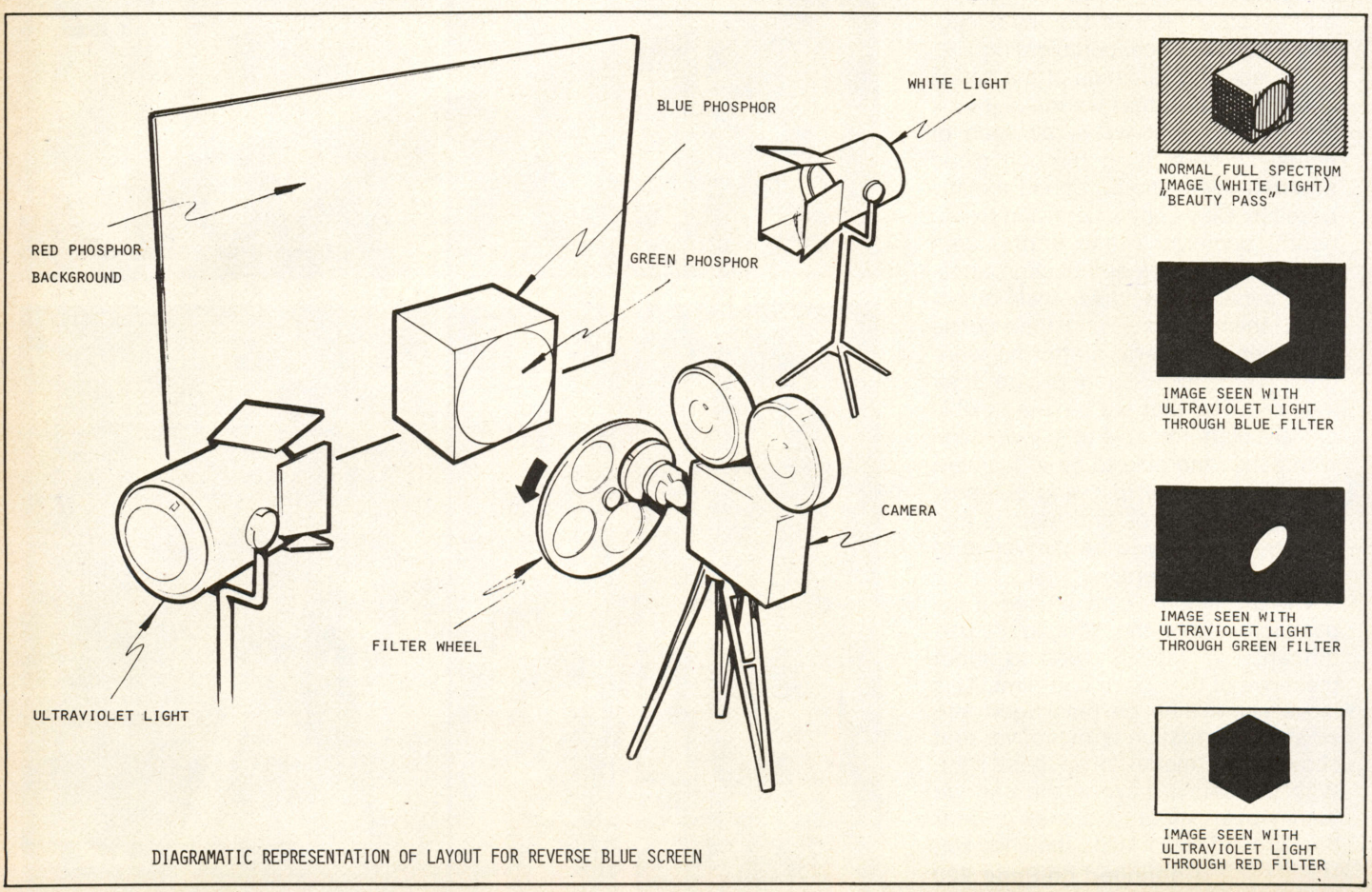
Most of the solutions, such as blue screen and sodium vapor, et al, were directed at the need to capture both the matte and the live action foreground scene simultaneously. In the realm of model photography, the introduction of sophisticated motion controls permitted the shooting of registered sequential passes in what is known as the front lit/back lit system. At Apogee, we use a highly refined narrow-band blue transmission screen with our specially developed fluorescent lamps for both conventional live action blue screen and front/back lit photography.

All systems, however, which depend upon an illuminated screen beyond the subject to produce a matte, are prone to the problem of reflected light known as "blue spill," especially when using shiny models or a wide angle lens. Additionally, very thin sections of the model tend to be "wrapped" by the light and drop out of the matte.

These problems, among others too numerous to mention, were all brought into harsh focus when Clint Eastwood approached Apogee, Inc., to produce the special effects for the motion picture FIREFOX. Not only did the model (a gleaming black aircraft) promise to be difficult to matte, but the backgrounds against which it would appear are the most extreme test of any matting system—namely arctic snow and ice and stunning cloudscapes.

REVERSE BLUESCREEN

To counter the above problems, Roger Dorney and I sought to turn the blue screen process "inside out." That is, instead of endeavoring to photograph an opaque subject against an illuminated screen, we proposed to photograph an illuminating source against a black background. We use the phrase "illuminating source" deliberately, because where this process differs from the familiar "front/back lit" process is that the subject itself is made to become a



DIAGRAMATIC REPRESENTATION OF LAYOUT FOR REVERSE BLUE SCREEN

source of radiation rather than merely a reflector of radiation.

This is accomplished as follows: A subject model is prepared in the usual way for photography, except that some of the usual constraints can now be eliminated. It is permissible by this method to incorporate highly reflective surfaces such as glossy paint or metallic materials or to use any color, including blue. In addition, fine elements such as mesh, thin wires, struts and wings of very narrow section can now be incorporated.

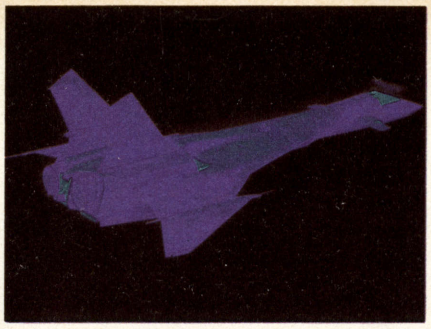
When the model is complete in all its detail, it is coated with a transparent medium, such as lacquer, containing a phosphor which is invisible in the absence of ultra-violet radiation. The subject can now be photographed, illuminated by normal stage lighting sources, with the possible addition of ultra-violet blocking filters such as Wratten 2B if the lamps are of a type that emit more than a minimal amount of ultra-violet radiation.

A second pass is now filmed, on the same film load, but consecutive to it. This time the stage lights are extinguished and the subject is irradiated with ultra-violet radiation of a wave length of approximately 360 nanometers. The ultra-violet radiation striking the subject is converted by the phosphor incorporated in the coating on the surface of the subject from 360 nanometers to about 430 nanometers and thus re-emitted as visible blue light.

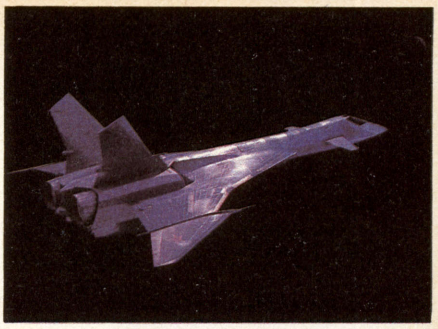
The subject is now functioning as an illuminating source rather than as a reflector of light falling upon it. It is this source which is photographed. An ultra-violet blocking filter, such as a Wratten 2E, is used at the lens to exclude from the camera the rather substantial amounts of ultra-violet radiation which would otherwise effectively fog a color film emulsion. This image is further refined by the use of a color separating dichroic filter at the camera lens. The image thus rendered is formed almost exclusively by the phosphor coating on the surface of the model, with relatively little vestigial imaging from the model itself. In this way, variations on the model brought about by paint color, texture changes, etc. are minimized, as the object is to produce a monochromatic image with as uniform a density as possible.

The resultant matte image has some substantial advantages over mattes arrived at by other means.

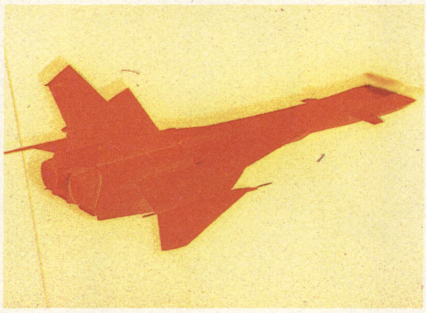
REVERSE BLUE SCREEN MULTI PHOSPHOR VERSION



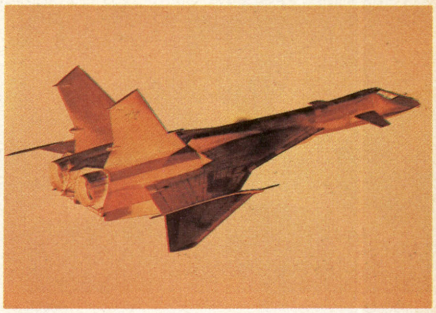
1) Matte pass (Phosphored Firefox irradiated with ultra-violet light.



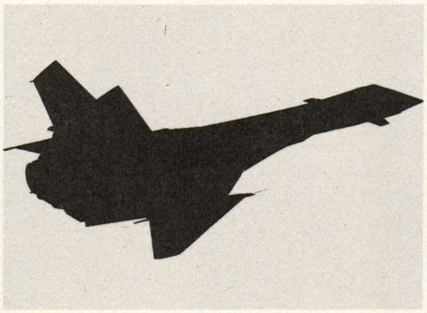
2) "Beauty" pass (Same model under incandescent light)



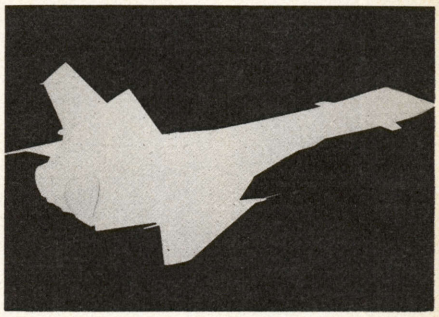
3) Matte pass negative



4) "Beauty" pass negative.

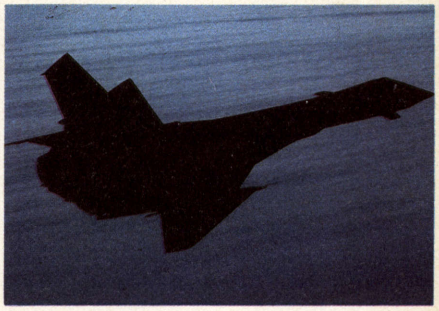


5) Hold-out matte.

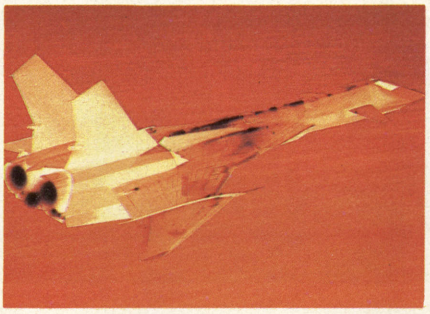


6) Burn-in matte

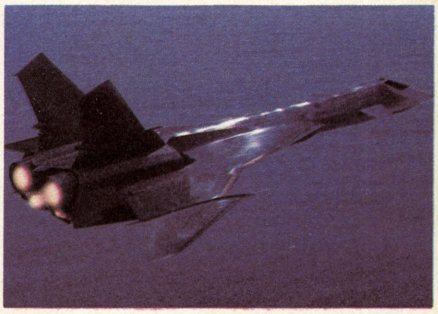
7) Background scene



8) Background scene bi-backed with hold-out matte.

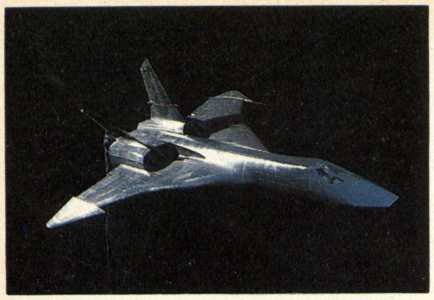


9) Color dupe negative of final frame

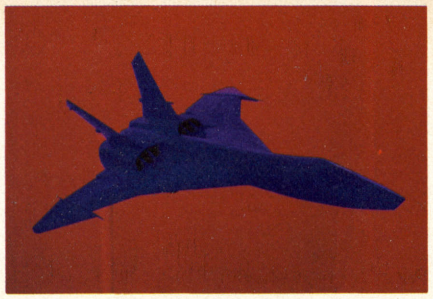


10) Final color print

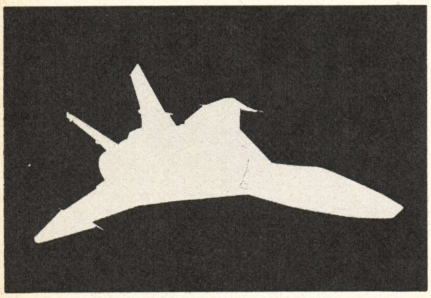
REVERSE BLUE SCREEN SINGLE PHOSPHOR VERSION



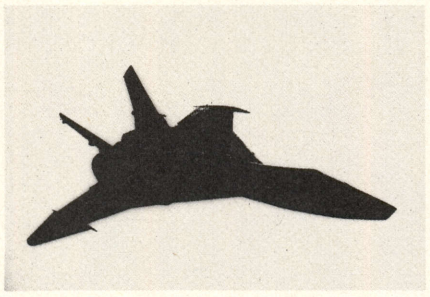
1) "Beauty" pass



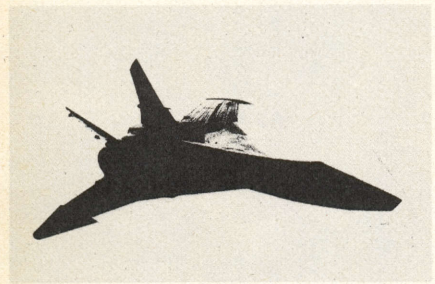
2) Matte pass (Red/Blue Reverse Bluescreen)



3) Burn-in matte made from blue record

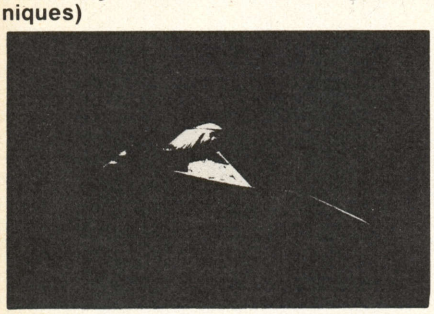


4) Hold-out matte from red record with mild "red spill

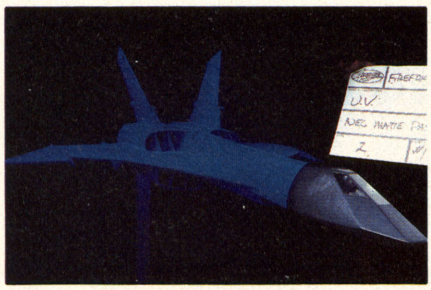


5) Hold-out matte from red record with severe"red spill"(similar to results obtained by conventional matting techniques)

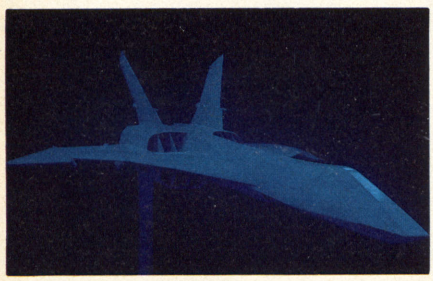
6) Matte-difference hold-out Matte (The difference between #3 and #5)



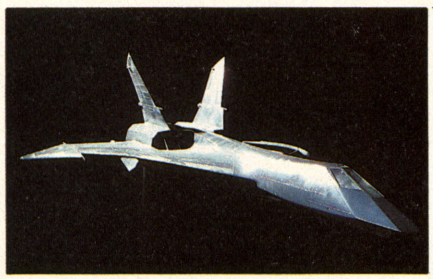
7) Matte-difference burn-in matte generated from #6



8) Ultra-violet pass with slate illuminated by incandescent light. (The slate can also be lit with ultra-violet light)



9) Model illuminated by ultra-violet light as in matte pass



10) Model illuminated by normal light as in beauty pass.

Some of these advantages are derived from the fact that there are fewer steps and fewer pieces of film required in the optical composition sequence of the "reverse blue screen" process. Others derive from the fact that, even under some extreme conditions, such as a subject receding into the distance and becoming quite small, the image retains its integrity and refuses to disintegrate (as happens when the same shot is attempted via conventional blue screen). Still another advantage is the ability to better record "streak."

The procedure in the optical department is straightforward, fast and economical. The original negative matte image is printed to a high contrast stock via a blue filter. The exposure of best contrast between the clear subject area and the opaque background area (usually a density of approximately 2.6 to 2.7) is printed. The selected density tends to "pinch" the subject image slightly, thus affording a tight fit. The reverse is then printed from this matte, completing the set. The first matte, or "burn-in" is then simply bi-packed with a positive of the original negative, printed and followed by a bi-pack of the background scene with the "hold-out" matte.

A variation of this process consists of the addition of a red phosphor backing and model mount which is recorded via a filter designed to pass red and blue exclusively. The result is the creation of an image capable of providing both the male and female mattes in one generation. These mattes can have the added property of containing different information from each other. Further, it naturally follows that this concept can be extended to include the green record, obtaining a total of three original mattes plus any number of permutational derivatives.

One application of this advantage is to be found in an aircraft model shot in which the cockpit area will be clearly seen, and it is desired to be able to see the background through the cockpit windows. In conventional blue screen, several problems could arise, among them: the light transmission through the several layers of glass could drop off in intensity and "fall out" of the matte or the transmission could be sufficient to form a matte and any information in the glass area (such as reflections) would be obliterated and replaced by the background. In reverse blue screen, the cockpit windows are covered

(probably with a phosphored friskette paper) for the blue pass, creating a complete matte, which, if used alone, yields an image of the cockpit and the glass with its reflections, but with a black void beyond.

With the addition of the red phosphor pass (in which the blue phosphor covers are removed from the cockpit), the area beyond the glass records on the hold-out matte. Thus, the background is printed, in addition to the glass and its reflections, as a double exposure.

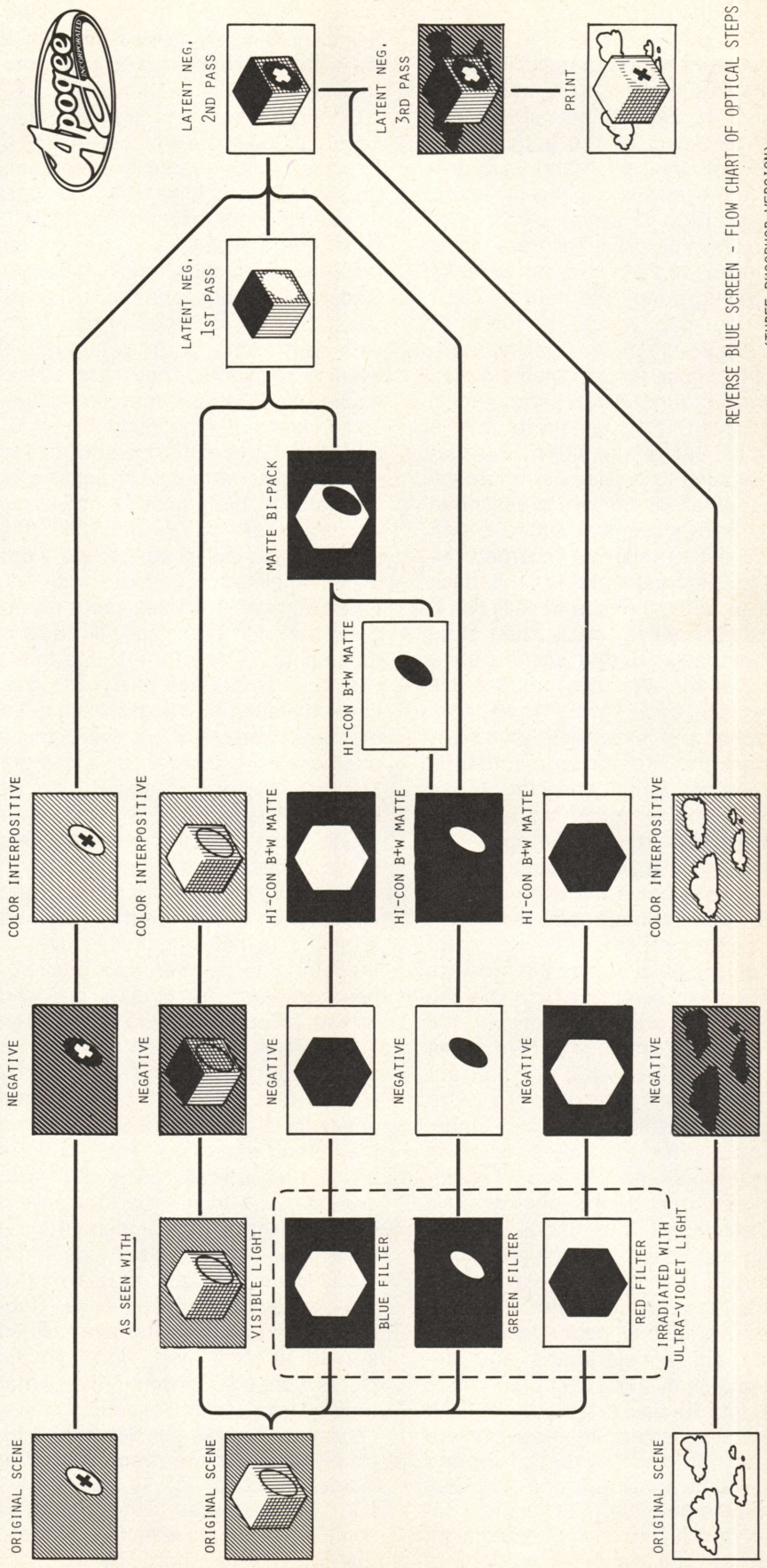
An example of a situation that would require the use of all three mattes would be the above cockpit shot in which a console screen is visible on the instrument panel. The third matte would allow the composition of an image which includes a screen display on an instrument panel seen through a window on which there are also reflections.

Another application concerns reflections on polished surfaces, in which the "spill" which will naturally occur in the "red screen" pass (just as it would in front/back lit or blue screen) will permit the print-through of the background onto the previously printed "whole" image of the subject, as opposed to the replacement of the subject by the background as would occur in conventional blue screen or by front/back lit methods. In other situations, a "matte difference matte" may be produced to enable one to print into the "spill" area only; for example, to print the reflected light of a sunset onto an aircraft. Or, one may wish to add just a little more substance to figures such as the chess pieces in the famous chess scene in STAR WARS, since all or part of the process can be applied to stop-motion animation photography by changing from sequential passes to sequential frames.

There are, to be fair, disadvantages to this system. For example, it is necessary to provide removable coverings for any holes, cracks or severe texture on the model, as any area that cannot be adequately irradiated with ultra-violet will not be able to generate sufficient visible light. These coverings then have to be coated with phosphor to complete the image and avoid holes in the matte. Of course, the technique, sadly, does not readily lend itself to live action photography.

The process, for which a patent has been applied, will be further refined and made available to the industry under license from Apogee. ■

The flow chart below represents the three phosphor version of reverse blue screen but, for the sake of clarity does not include the 'matte difference matte' which may be generated from any discrepancy between the blue and red mattes for example. On 'Firefox' for the most part only the single phosphor version was used, in which both the 'burn in' and 'hold out' mattes were generated from a single blue U.V. matte pass.



cause we were so far from these reference points (the planet or stars), the "matched move" didn't have to be particularly accurate.

To achieve the more realistic imagery required for FIREFOX, we needed to shoot the backgrounds first, accurately recording all the angular displacements (roll, pitch and yaw) and then return and shoot the miniature ships on stage. This meant that rather than using a program generated for a ship move we liked in order to make our background, we had to first match the ship, without its move, to our background plate. This meant recording angular displacements during our background plate photography. To achieve this we used data from a Litton I.N.S. System (Internal Navigation System) to provide our reference frame. What we did here is described in Mat Beck's segment, but roughly it comes out to this: we recorded the angular displacements, the roll, pitch and yaw of the airplane while in flight. We tagged these, on a head slate number basis, to the scenes on a particular roll. We then brought this information back to our shop, photographed our miniatures while playing back the information recorded in the aircraft when shooting those scenes. This provided us with the ability to make the model appear to be in the real space of those clouds. This is backwards from the conventional space photography technique, and is extremely time consuming. Not only do you have to play the program back, but you now have to modify the program to give the model, or the plane you're pursuing, its own sense of motion relative to you. Our hats are really off to the people who programmed these shots on stage, particularly for their persistence in making the Firefox "fly."

To record both the photographic and electronic information for the backgrounds, we used the previously described Lear jet with nose camera and belly mounted probe lens. We used a variable camera speed to enhance our accelerations and decelerations; in some cases we ran as slow as ½ frame per second. We used a very wide lens on the nose camera to amplify the sense of speed achieved by our slow frame rate. Clay Lacy, who flew the Lear for us, contributed by his steady hand and flight expertise significantly to the look of our "dogfight." In many cases it would take 10 minutes of feather touch feeling to produce 6 seconds of seat grabbing high "G" turns. Every flinch shows at the ultra slow frame rates, and you have to know a plane well to hold it in a steep bank with a slow rate of turn without dropping the nose camera point of view.

Once these plates were shot—about 20,000 some odd feet—we had to come back and edit this material. Denny Kelly and Mike Kelly, our editors, edited our background plates, taking into consideration the consistency of the clouds, shot in Greenland, New Orleans, and the California coast. Shot at all times of day, from very early in the morning, late in the evening, to midday. They matched the backgrounds up so that there was some sense of continuity. Much of this stuff cut directly, one shot to the next, and a mismatch in lighting, a mismatch in brightness of scene really could give it away. While this material was being edited, we went over completed sequences with Mr. Eastwood. We then set about laying down the rules for the specific ships in those shots. One of the things that I set about to do was to try and give some distance to these airplanes so that it looked as if we were really photographing them from a camera platform in another aircraft, rather than a privileged POV, which allowed you to get three inches under the wing of the airplane in every case.

Sitting down with the editors, and working out the moves that they had in mind, and matching those moves to the storyboards that had originally been prepared for Firefox, provided us with an opportunity to really rough the movie in, so we didn't shoot a lot of material that wasn't used in the film. In fact I don't think you'll find anything of the material we shot on the cutting room floor. The pacing of the film, specifically using the backgrounds, and then, when they were available, those ship elements on black and white, was much more easily done through the use of this pre-cut background sequence. Subsequently these background plates served another use, and specific plates were prepared for process material. Using rear projection where necessary to hold our depth of field, simply because we were too close inside the cockpit to use front projection, we presented what I think is some of the most effective process that we've ever shot. The use of a moving key light to provide shadows moving on our foreground subject, the use of some lit surfaces above and around the cockpit to give reflections on the helmet, and Bruce Logan's eye for balance and lighting helped to provide a very realistic look to the interior of the cockpit. We also used front projection for those sequences where we were outside the cockpit and our depth of field was adequate. The front projection gave us a higher quality image and also provided us with more camera distance flexibility. These background plates were also cut into the sequences that included the shots with ships to be added.

Now all of this stuff ended up being coordinated, in this case by Percy Angress. There were a great number of shots to be dealt with, a lot of changes that took place on a daily basis, in many cases things that didn't work, and invariably a crew heading off to some weird location with the camera equipment that was needed immediately to shoot something else on stage. In conjunction with Bob Shepherd, the effects unit production manager, and a score of other unshakable souls, the enormous number of components in this movie came together in a fashion that we think is very special. It turns out that basically we at Apogee are a company of inventors. Our talents, when best applied, result in ingenious solutions to problems. As a group we have focused our problem solving abilities in the field of visual effects for approximately seven years. As a result of various investors' faith in our ability we've tried to produce the unlike-anything-you've-ever-seen-before visual, in a way that makes it economically feasible. We are very proud of FIREFOX, and we think this is some of our best work yet.

SPECIAL OPTICAL EFFECTS FOR "FIREFOX"

by ROGER DORNEY

When we first were approached to do the effects work on FIREFOX, all I could think about were the cloud backgrounds. In the past, movies with numerous special effects have relied heavily on dark or variegated backgrounds to hide any matte lines or imperfections in a travelling matte shot. Star fields & night skies are common examples. The Firefox, how-

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ever, had to fly through cloudy skies, over ice floes, and against ice trench backgrounds. From an optical standpoint, three things can ruin a travelling matte shot: color imbalance, contrast imbalance and, of course, matte lines.

With the variety of backgrounds used throughout this movie, the color balance had to be constantly varied. Because the Firefox is a shiny, black airplane, the highlights had to blend into the background scenes so that the imaginary looked believable.

The contrast of each background scene was the next variable. Since the background plates were shot on many different locations (Thule, Greenland; Gulf of Mexico; Montana; Catalina Channel; and Apogee's parking lot) and since weather and screen directions varied, the contrast, too, varied from shot to shot. We therefore decided to control the contrast by using separations, or interpositives, of the models as compositing units. The models were shot on stage with the contrast in mind, so that the lighting of the models tied the foreground airplane into the background plate. In some cases, where the contrast of the Firefox was higher than that of the background scene, we had to flash the foreground image (the Firefox) to make it blend better into the background. Another method for lowering the contrast of the matted image was to use a thin hold-out matte. This was done extensively in FIREFOX.

The last, but most important, variable was the matting technique. When the initial testing was done to determine lighting, action, and optical techniques for this movie, we confirmed our suspicions that a shiny black airplane model is extremely difficult to shoot against a blue screen. We used a modified Stewart transmission blue screen illuminated by Apogee's propietary fluorescent bulbs. These lamps emit a narrow band of blue light, resulting in a very pure blue separation. Nevertheless, the problems inherent in photographing shiny surfaces in front of a blue screen continued to plague us in the form of "blue spill," the result of light from the bluescreen being reflected off the shiny black model, which results in "holes" and "fringing" appearing in the matte. Apogee's camera crews resorted to ingenious methods to combat the problem, including multiple passes with various lighting and filter combinations. These were then manipulated in optical to produce the necessary mattes. The process was, however, extremely time consuming and costly.

As an alternative to this standard technique, Apogee devised a new approach to travelling matte photography. It was first proposed by Apogee's Jon Erland (R&D department head) as a way to overcome some of the restrictions on the types of models that could be matted and to provide a quick and inexpensive means of matting. It proved to be just so.

He reversed the old technique. The model would now be blue, shot on a black field. This is only possible when photographing models on a motion control system, because the new technique is a double pass system. The first pass is that of the blue model, the second pass is the "beauty" pass. Because the same model must be used, the blue for the matte pass was achieved by the use of a clear fluorescent paint devised by Erland. This paint fluoresced when irradiated by ultra-violet light, but remained clear when lit by incandescent stage lights.

The next step of this "reverse blue screen" is the optical processing. The matte set required for the composite can be made from the matte pass, permitting the beauty pass to be used intact, as it is now unnecessary to make color separations of it. These two units, being of the same generation, are in perfect registration and produce no discernible matte lines. In many respects, this is similar to what is known as front lit/back lit compositing. The essential differences are that only the coated subject records on film, without the "holes" and/or "fringes" that would occur in conventional front lit/back lit procedures, just as they would via blue screen. A further advantage is that a garbage matte is not generally necessary, nor are the complex illuminated pylon model supports.

The new "reverse blue screen" eliminated many hours of optical time and money, as it eliminated the need to generate the mattes as in conventional blue screen.

The optical work on FIREFOX was unique, in that Apogee's optical department (Paul Bolger, Mike Sweeney, Rick Gilligan, Bruno George and Jerry Pooler) helped to develop a new traveling matte system. It was also rewarding, in that we worked on a hit movie co-starring an airplane that flies not against starfields and night skies, but rather against and through cloudy skies, over ice floes, and up ice trenches.

MODELS FOR FIREFOX

by
GRANT MC CUNE

In planning the construction of the props and miniatures used in the effects photography for FIREFOX, a two day planning session was held with John Dykstra, Al Miller, Bob Shepherd, and myself. Each story board of the two hundred and eighty some shots was judged for the action, content, and possible scale of the props.

The most apparent design problem was what to do about the plane. Obviously a highly detailed model for use on a motion control stage would be necessary. This would solve most of the flying sequences. However, it was decided that a miniature, coupled with process photography, would not solve the problem of action in or around the Firefox. We decided that a full scale, ground operating mock-up must be made with a second nose section for process photography. Other parameters included being able to taxi and being relatively simple to ship to various locations. We guess that the potential cost of these props would not exceed the cost of doing the shots by complicated process photography and that the results would be far more satisfactory.

At this time no decisions had been made regarding location shooting and all the boards for landing and take-off sequences were planned as miniatures. However, soon after production started we were informed by Malpaso that an early shoot in Greenland was being organized. We were asked to prepare the full scale mock-up in six weeks. This seemed possible but a decision was made to scrap that idea because the shipping could cost as much as a quarter of a million dollars. This would be more than twice as much as the single mock-up cost to build. In lieu of not having the mock-up there, it was decided to attempt radio controlling a stage miniature for flight and taxiing scenes in the Arctic and to prepare several radio controlled helicopters and various and sundry models for the "ice pack" scenes.

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The radio controlled helicopters had been planned from the beginning and were substantially down-the-road in production with a high potential of success. The radio controlled Firefox however was not. To change the production of the stage model Firefox over to producing a flying version several things were done. Not being a powered model pilot myself, two professional pilots, Jay Replogle and Larry Wolf, were hired and designing began. The area and chord of the wings were increased, the position and size of the air intakes, the placement of landing gear, etc.

The molds for the Firefox miniatures were quickly adapted for use with carbon fiber and epoxy systems in the event that a high-strength-to-weight-ratio would be needed. The parts finally produced with epoxy and standard fiberglass were quite adequate and a single engine, ducted fan model was produced weighing 14 lbs. In attempting to determine the center of lift and placement of the center of gravity, this model was corkscrewed into the tarmac at Whiteman Airfield. Quickly another body was produced and this one shot into the cornfields at the Sepulveda basin at about 120 mph with the same effect. While these lovely tests were going on a third model was produced and ground tested using two engines with two ducted fans. This model was not destroyed however, and was prepared to go to Greenland. A third single engine version was prepared the night before shipping; and both planes left for Greenland without ever having been flown.

At Thule Air Base the ships and helicopters were finally detailed, painted, and tested. All flew adequately off the taxi way, but only the helicopters were able to fly from the ice floe. Consequently, the R.C. Firefoxes were later adapted for use as electric powered and wire rig radio control models and they performed well for solving these boards. The final "coup de grace" for these miniatures was to slide down a wire filled with explosives to satisfy the final destruction of Voskov's plane. The radio controlled helicopters met similar ends off the coast of Catalina Island.

The schedule for completion of the full scale plane was put back until Greenland was finished. It was completed in the summer for first use at Van Nuys Airport for the hangar scenes. The two cockpit interiors were completed in the fall for process photography at The Burbank Studios.

Other decisions pertaining to miniatures dictated the construction of the "ice trench," the miniature mountains and trees, and four other scales of the Firefox. Also, several additional aircraft and ancillary miniatures were planned and produced.

The original storyboards and production ideas were adhered to strictly, with nearly all sequences completed as to the original plans. This phenomenon, I believe, added greatly to the success of the production schedule and to that of the motion picture itself.

The model shop was in production a total of 14 months with an average crew of 15 people, including art department, machine shop and effects: Grant McCune, Marty Kline, Bill Shourt, Dave Beasly, Richie Helmer, Ken Swenson, David Scott, David Sosalla, Dewey Webber, Pat McClung, Pete Gerard, Mike Joyce, Mike Speaker, Gary Rhodaback, Steve Sass, John Shourt.

The following is a complete list of the major props and miniatures created by Apogee shop during the 14 months of FIREFOX production:

I. Aircraft
- A. Full scale Firefox.
  1. 61 feet long, 42 feet wide, 17 feet tall.
  2. Powered by 1600 cc V.W. engine with automatic transmission, capable of 30 mph.
  3. Constructed on McDonnell Douglas F-4 Phantom landing gear.
  4. Original owner, low mileage.
  5. Constructed of steel frame, plywood buckheads, spruce stringers, and luan plywood covering.
  6. Equipped with 3 million B.T.U. hot air balloon heaters and 8,000 C.F.M. blowers.
  7. All flight surfaces operated by air, electrically, or pushrods, including canopy, nose strut, air brakes, spoilers, and landing lights.
  8. Equipped with a (4) four station intercom and a 2-way radio.
  9. Required a crew of five to operate all functions.
- B. Front one third full scale Firefox.
  1. A mold of the first 21 feet was produced and a second cockpit constructed with partial interior.
- C. Cockpit interior.
  1. Fully lit with manually operated avionics.
- D. 1:12 scale Firefox.
  1. Three radio control versions 63 inches long, 44 inches wide, 19 inches tall.
  2. Two stage versions with operable flight surfaces, gear, rocket doors and light effects engines.
- E. 1:36 scale Firefox.
  1. Two 21 inch stage models.
  2. Propane engines.
- F. 1:96 scale Firefox.
  1. Two 9 inch stage models.
- G. 1:4 scale partial Firefox.
  1. 16 feet long underside only equipped with electrical doors and motorcycle shocks. Operated from "titan crane" for landing gear shots.
- H. 1:8 scale Mil-24 Helicopters.
  1. Three radio controlled gas powered and one electrical powered.
- I. 1:72 scale Mil-24 Helicopter.
  1. One non functional stage model.
- J. 1:36 scale Russian "Bear" refueling plane.
  1. Original model from "Ice Station Zebra" re-worked for blue screen photography.
- K. 1:48 scale "Tupelov 134 inch Russian airliner.
  1. Re-worked model of a boeing 727-100.
- L. 1:48 scale Russian "Badger" medium bomber.
  1. Simple model for explosion effects.

II. Ships
- A. 1:8 scale partial Russian "Missile Cruiser."
  1. AFT one third model of "USS FOX."
- B. 1:12 scale nuclear submarine conning tower.
  1. Had radio controlled periscope and radar antanae.

III. Mini scenes.
- A. 1:12 scale arctic "surfacing" scene.
  1. 12 feet by 12 feet forced perspective ice scene with hidden water tank and sky cyc to work with conning tower.
- B. 1:12 scale arctic "landing" scene.
  1. 24 foot by 80 foot table.
  2. 8 foot by 80 foot sky cyc.
  3. 8 foot by 24 foot sky cyc.
  4. A 60 foot by 80 foot silk was flown for lighting.
  5. Rigged with two guid wires and trolly mechanisms for takeoffs and landings.
- C. 1:144 scale "ice trench"
  1. Twenty-two 10 feet long 5 feet high by 2 feet thick modules sculpted and painted as ice or rock walls.
- D. 1:72 scale mountains.
  1. Several quickly constructed mountain scenes to operate with air cannon and avalanche effects.
- E. Miniature trees.
  1. Forty 1:72 scale coniferous trees.
  2. Forty 1:200 scale coniferous trees.
  3. Several hundred 1:1000 coniferous trees.

SHOOTING EFFECTS MODELS FOR FIREFOX

by
JOHN SULLIVAN

When we started FIREFOX the main challenge for the stage was to make the miniature of the plane appear to react as if it were really flying through the environment in which it is seen. In the past, we had applied our motion control and blue screen techniques to spaceships in space. This, unless there was an explosion, an effect, or a nearby planet, didn't require reactive lighting to help sell the effect. However, we had to make the Firefox appear to be flying through a far more dynamic environment of lights and darks, or the composite of the ship and background wouldn't blend together. We experimented with a number of approaches, two of which we used in the actual photography of FIREFOX. In the first technique, Doug Smith and I began to experiment with the concept of projecting the selected background plate

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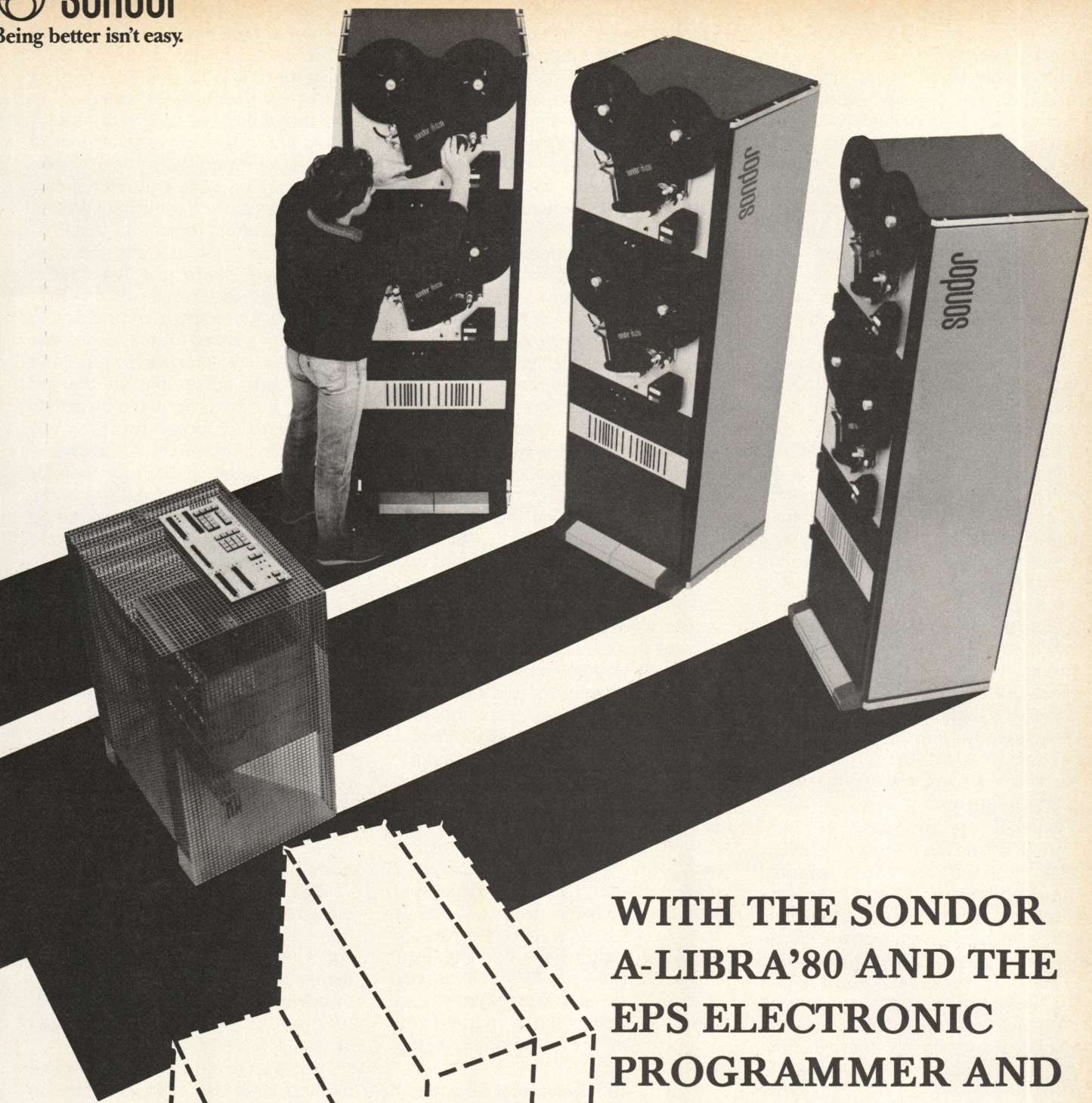

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onto the ship, by either direct projection, or by projecting onto a high gain rear projection screen positioned in such a way as to make the image reflect on the unkeyed side of the plane. Both approaches worked, although the technique with the screen looked better and was therefore the chosen method. This reflection was shot as a separate element, so the optical department would balance its density with the other elements when making the composite.

We had three sizes of models to choose from, depending on the requirements of the shots. A large 64 inch model was used for close-ups requiring great detail, articulated airbrakes, flaps, etc. It was this large model that got the full reflected light effect. In less demanding situations, with the large model and the 24 and 9 inch models, we used a foam core for fill in order to give us a large, non-source fill effect. The foam core was lit in a number of ways to achieve the desired look. In some instances a rotating drum, made from a curved wire screen to which blue gel patches had been attached, was rotated around a mirror, thus giving us the effect of changing light. In less demanding situations, we lit the foam core directly with white and blue patches and let the programmed movement of the Firefox make the changes for us.

One of the problems of photographing the Firefox was the highly reflective finish. This finish reflected the blue screen and thereby effectively "wrapped" the ship in blue light, making a good matte impossible. One solution to this problem was to make a second pass over the normal blue pass. In this second pass, we lit the miniature as flat as possible, draped everything but the miniature with black velvet and attempted to burn out the blue spill by over exposing the flat lit plane. The obvious disadvantage of this technique is that the over exposure increases the image size of the miniature. Somehow, Roger Dorney and his crew managed to manipulate the mattes and make them fit, but the problem with doing the photography this way was time. We had to go through an extra lighting set up on the stage, and the optical department had to finesse the elements until the shot worked. About this time, Jon Erland completed a process that he had been developing for Apogee to solve just such problems: a negative matte system.

What we call our negative matte system allowed us to photograph a highly reflective model without being concerned by the blue screen reflections on the model. We used the system on stage by simply lighting the model with an ultra violet light source, making sure we didn't see the lamps if at all possible. We thereby eliminated the need for a garbage matte in many instances. To maintain the integrity of the mattes, openings like the air intakes under and over the wings, and the jet exhaust ports had to be plugged in such a manner as to allow us to fill the hole, but not alter the shape of the ship. Model maker Pat McClung, responsible for the painting and finish on the Firefoxes, spent hours forming excellent plugs for the models. Thus the model itself became the equivalent of the blue screen. The negative matte system allowed us to reduce the number of elements we shot to U.V., "beauty" (i.e., normally lit model), engine, and reflection passes. In many instances, the engine and reflection elements were not necessary. The other advantage of this system was the elimination of the blue screen as a restriction to our programming. We no longer had to concern ourselves with keeping the blue screen behind the model when making wide pans, for example, a restriction that at times can make miniature photography a frustrating experience.

With large numbers of separate elements, the importance of Apogee's motion control and follow focus system became very evident. Without their excellent accuracy and reliability, we wouldn't have been able to attempt a show like FIREFOX as any inaccuracies in registration would have resulted in poor mattes and would have spelled disaster in the final print.

When Doug Smith, Mat Beck and I were instructed as to the look of FIREFOX the prime directive from Clint Eastwood and John Dykstra was to make the Firefox go extremely fast. To do this, background plates were shot with exaggerated visual speed, achieved by filming at slow frame rates from a fast jet. These background plates set the pace we had to follow in our model shooting.

The ice trench backgrounds were shot in a different manner. Grant McCune and the model shop made a miniature trench which was photographed by Mark Gredell. They used a high speed servo motion control system, a high speed VistaVision camera, a wide angle lens and all the forced perspective Grant and his staff could throw into it.

When a shot was assigned to an operator, he would be given a storyboard and a registered color print of the background, with the scene length marked on it. Our normal procedure was to look at the background on Apogee's pin registered VistaVision Moviola, then discuss the shot with John Dykstra and the special effects editor working on that sequence. This kept us informed as to what John wanted from the shot and it kept the continuity tied in to what had already been done in the sequence. It also gave us the basic feel for how to program the look we wanted. Programming the basic move wasn't unusually difficult for most of the sequences. Matching some of the displacement which occurred during the photography of the background plates, however, was difficult. When we shot the Greenland plates, we hadn't anticipated some of the problems we were creating. Due to airplane motion, all the Greenland footage had to be tracked for displacements, and these displacements had to be incorporated into the programs so that if the background dipped, so dipped the Firefox. We finally ended up with a system which consisted of a microscope onto which we had added a pin registered movement on an X–Y platform. In the eyepiece of the microscope was a reticle which allowed us to measure the displacement of a chosen point, from frame to frame, with the camera person's red eye attached to the objective lens—not always an easy thing to do when the only thing in the picture is a bunch of puffy, soft-edged clouds.

Needless to say, frame by frame plotting was less than desirable in terms of efficiency. To rectify the problem, Al Miller and Mat Beck in our electronics department came up with a system to record data from an airplane Internal Navigation System (INS), thus recording the roll, pitch and yaw differences from frame to frame, as we shot background plates from the Lear Jet. This saved us hours of hand plotting at a later date. Once the information was recorded, it had to be translated by computer into numbers usable in our motion control system. The program to do this was created by Susan Sitnek, one of our camera assistants, who is quite

FIREFOX

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proficient with computers. With the information in a usable form, shooting time began to decrease. There were two systems for using the INS data. One, the motion control on Stage One, operated by Mat and myself, with the assistance of Richard Haas and Tama Takahashi, allowed us to program the move and then add in the displacements required to match the background. The system used on Stage Two by Doug Smith, Jody Westheimer, Susan Sitnek and Dennis Dorney required the displacements be put into the motion control first, and then the program be added to them through an editing process. Both systems worked quite well. After we had what we considered a decent program, we would shoot an RAR (a black and white test), which could be bi-packed in the Moviola to see the composite effect. As a general rule, we had to do this a number of times before we arrived at a good program. When we were satisfied with the program, we would show it to John Dykstra and Clint Eastwood (if he was in the facility at the time) to see if there were any changes they would like made before we shot it on color film.

For myself and the rest of the people in our camera department this was a challenging film, requiring us to take on a project which didn't leave us much room for mistakes. A combat plane like Firefox is something that everyone has seen on film at one time or another, and they therefore have certain expectations as to how it should look while flying. We had never had to deal with this before; in space the rules are less strict, and people were willing to accept spaceships flying in all sorts of strange ways. Not having spent much time watching spaceships fly around shooting at one another in real life, people are willing to accept a variety of spaceship moves. The need for aerodynamically realistic movements in "Firefox" made it an interesting, sometimes frustrating but ultimately rewarding film to work on. We also had on hand for most of the film trainees from the current Special Effects Apprenticeship Program: Pat Harrison, Eric Peterson and Josh Morton. They were most helpful, and enthusiastically became involved. We, for the greatest part achieved our goals by having the Firefox flying realistically over light colored cloud and Arctic backgrounds without having crawling matte lines.

ELECTRONICS AND SOFTWARE FOR FIREFOX

by
MAT BECK

The movie FIREFOX had no aliens, ghosts, apparitions or parasites. It had only a fighter plane that went faster than any fighter ever flown. So the challenge for Apogee was not to achieve a new look from some other world, but to make our model plane really appear to be in *this* one, in a variety of exotic but real backgrounds, some with live actors. And the illusion had to be maintained not through a few quick scenes, but through 30 minutes of aerial search-and-destroy, on which the dramatic climax depended.

Accordingly, the electronics and software departments were presented with two main tasks. First we needed the capability of controlling, and/or recording, camera motions in distant and sometimes hostile locations, so that the movements of the model plane, matted in later, matched those of the background. And we needed sufficient flexibility to accommodate camera speeds up to and beyond live action.

Secondly, we needed new techniques for aerial photography that allowed the visual sensation of a Mach 6 dogfight, i.e. POVs and backgrounds with speeds, turns, and accelerations that are impossible in any plane now flying, much less one available for camera mounting.

The first task—that of controlling camera motion in distant locations—was solved, not surprisingly, by making a motion control system portable. Fortunately they have been getting smaller in recent years. Al Miller, head of electronics, and I were just working on a new motion control system. (In general, he did hardware and I did software.) The system, assembled by Steve Sass and Rachael De La Cruz, is based on the Apple personal computer (with expanded memory) which is mated to an interface box and one of Al's newest camera controllers. The interface or controller can be varied depending on application.

For location filming the "field system" consisted of computer, disc drives, and monitor mounted together in a portable console, plus an interface box that could drive up to eight channels of programmed motion (using either DC servo motors or remote stepping motor drives).

Alternatively the system could record, through encoders, the motion of any axis being driven manually, (i.e. someone working the wheels for camera pan and tilt). Thus, when filming in Greenland and Austria, John Dykstra was able to generate camera moves to follow the flight of an imaginary plane, and the movements of the nodal point head were duly recorded for later playback on the miniature stage.

The camera controller was the Apogee model VII, also designed by Al Miller. It is smaller and lighter than any previous model and is the first to allow for remote computer control. An encoder servo motor drive has proved to be smoother and more reliable than potentiometer based systems.

For the voluminous amounts of aerial footage needed, the main platform was a Lear jet rented from, and piloted by, Clay Lacy, a well known commercial and racing pilot.

Don Trumbull, Dick Alexander, Bill Shourt, and Mark Cane worked out a way of modifying the VistaVision camera to fit inside the nose cone of the Lear jet, in place of the radar. A special pipe frame supported the camera, its optical shooting port, and a video camera for monitoring the view. It also conducted hot air to keep everything warm enough to run at 30,000 feet. For side views they designed a plate allowing the "nose camera" to be mounted in the cabin, shooting through a window.

Additionally an Astrovision periscope system from Continental Camera was mounted through the plane's belly. Also fitted with a VistaVision camera and video pickup, it was capable of 360° of pan and about 45° of tilt through a remote console operated by David Nowell or Greg Schmidt on different flights.

Generating data with footage shot from an airplane looked like it would prove more difficult. But above all, the footage had to be exciting, and no matter how well we matched model planes to backgrounds, no one was going to mistake the view from a 400 mph Lear jet for that of a 4000 mph Firefox. Extensive skip framing would only result in strobing and abrupt speed changes. Undercranking was fine, but any change in camera speed meant a change in exposure. Enter the Miller-designed, Apogee aerial camera controller. Beyond the conventional functions of controlling camera speed and counting frames

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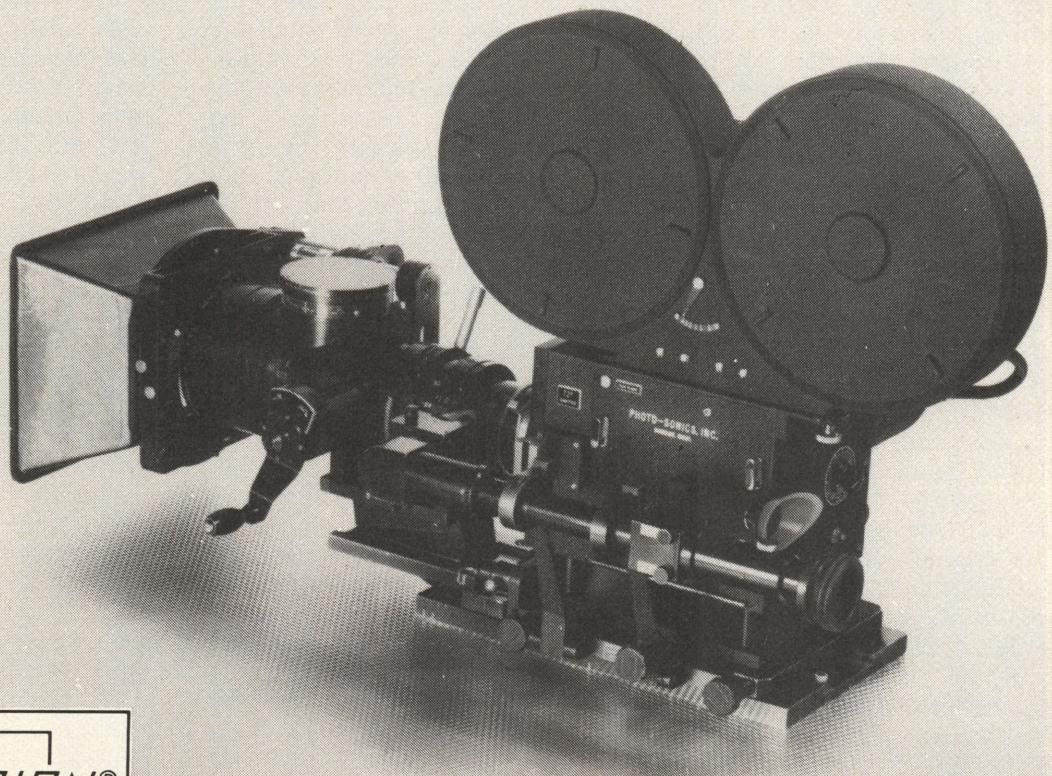

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(and informing the computer whenever it counted one) it had the additional virtue of controlling the lens iris through a remote servo, and, when given a reference exposure, computing and setting the proper f stop for every speed from 24 fps to ½ fps. Thus the apparent speed could be varied continuously, with constant exposure and proper streaking; and our hero, with missiles on his tail, could do 200 to 2000 quickly enough to make stomachs queasy in dailies.

More work remained. Controlling the speed was difficult to do manually, because of the reciprocal relationship between camera speed and apparent screen speed. At low camera speeds, even a small change made an enormous difference in apparent speed. So we added a camera speed ramp control. It automatically accelerates or decelerates the camera along one of four computer generated curves that account for both the reciprocal speed relationship and Dykstra's estimation of a real jet's performance. They were soon known, because of their shape, and certain Monty Pythonesque leanings of the company, as Dykstra's theories about dinosaurs; thin at one end, thick in the middle, thin at the other end. "Pterodactyl II" proved the long term favorite. The end result allowed Dykstra to pick a cloudscape that matched a specific scene and request, for instance, a smooth change in screen speed from 200 to 2500 mph in seven seconds of screen time. The change could then be initiated on cue by a simple button push, while Clay Lacy was putting the plane through some wondrous multi-G maneuvers and the operators (Doug Smith, John Sullivan, Al Miller, or the author) were busy trying to keep their faces from falling off. The whole jumble was powered by an inverter through a breaker-protected power distribution box. Finally, a remote temperature sensor mounted in the nose allowed Clay to adjust heat flow to the camera, when he wasn't trying to puree his passengers.

The aerial camera controller proved itself a variety of applications besides just the Lear jet. Some low flying and lift-off POVs in Greenland were shot from a Bell jet ranger helicopter piloted by Jim Gavin or Uvé Hansen with the camera mounted in a remote pod facing forward or to the side. Rubberized heating pads controlled from inside the cockpit kept the camera warm.

At an Austrian Air Force Base, for lack of a camera car, we helped Dick Alexander mount a VistaVision camera on top of a Russian armor plated limousine. Then at 5:00 a.m. of a very cold morning we tooled up and down the runway shooting takeoff POVs with Dykstra in the front, directing; while the Austrian driver tried mightily to keep the Russian transmission from shifting in mid-take, and in the rear, John Sullivan and I ramped speeds up and down, shared a blanket and fondly remembered the warm days in Greenland.

Recording the background motions in aerial photography is a bit trickier, because the camera platform itself (i.e. the plane) shifts in response to turns and turbulence. A miniature plane moving steadily against a jerky background would itself seem to jump, or look unreal without the viewer knowing why. Dykstra made an important simplifying assumption; that the Firefox would always be far enough away from the camera plane that horizontal or vertical displacements would cause insignificant movements relative to the background. Both Firefox and background were assumed to be at infinity. Only angular displacements of the plane, i.e. changes in pitch, roll and yaw, were important in matching background to model. So, along with recording the changes in attitude of the astrovision camera (fixed mounting for nose or side camera), we had to record changes in attitude of the camera platform (pitch, roll and yaw of the plane). For this application the same location computer console was mounted in the Lear jet. We used an inertial navigation system that records miniscule variations in the plane's attitude and velocity, and integrates them to determine position, ("changes in attitude-changes in latitude," J. Buffet).

Al Miller designed an interface box that converted the plane's attitude data into digital format, along with pan and tilt data from the astrovision camera. I altered the program slightly so each camera frame the computer recorded all the relevant data for later conversion to motion control.

Back at the studio all this data needed processing. It turned out to be a relatively long road from raw aerial data to motion control, partially because of the number of variables which had to be considered. All data had to be transferred from absolute angular position to motor rates per frame, and each channel had to be scaled differently, *and* linked in editorial sync to decisions made in the cutting room.

In addition, a fair amount of trigonometry reared its ugly head. To get an idea of the process, consider the case of the nose camera pointing directly forward. When the plane rolls 20° right wing low, and tilts 10° nose high, the camera's view does the same thing, allowing for focal length of the lens. Now consider the same data applied to the background shot from the astrovision camera, which is, for instance, running 2.2 times as fast, is panning through 37° right of straight back and is tilted down 14° from parallel to the airplane. What does a 10° tilt up of the camera platform mean to that background. The exercise is left to the reader. At Apogee the exercise was left to Susan Sitnek, who wrote a program that kept track of all of this stuff marvelously, and churned out data for either of 2 motion control systems with dispatch. Al Miller contributed equations and 3-D drawings. Percy Angress was the coordinator who, in addition to all other organizing, matched background with shots with data with stages and fended off chaos at every turn.

Several lessons appeared in the course of the movie. The advantage of a software based motion control system was one. First, its compactness made it portable, and capable of being mounted in small places. Secondly, its simplicity made it quite rugged, and relatively maintainable throughout its travels. Thirdly, the reduced unit cost made it possible to have several on hand, boosting productivity and simplifying scheduling. It was not uncommon to have four systems running simultaneously, with sufficient spares on hand for possible problems.

Last, perhaps most importantly, its flexibility allowed it to evolve in as many directions as the film demanded. For complicated setups a person with a software experience became a useful adjunct. In Greenland and Austria, I was sometimes programming ½ day ahead of the photographic requirements and praying for rain. At the ice trench shoot, with its restrictions on movement, high speed, and high frame rate, Paul Johnson worked continuously, adapting the program to suit those requirements, and improving it generally.

A second lesson, hardly a new one,

124th SMPTE Technical Conference and Equipment Exhibit
November 7–12, 1982, New York Hilton Hotel, New York City

Conference Theme

The theme for the 124th Technical Conference Papers Program has been announced by Program Chairman **Gary Borton,** Eastman Kodak Co. According to Borton, the theme will be **Commitment to Tomorrow's Technology.** In conjunction with this subject, a full list of topics has been selected both in television and motion pictures. Partial lists of topics have been presented in earlier *Journals.* Below is a complete list of topics as of the date of this writing. The television topics are:

- International Television
- New Technology for Television
- Television Audio
- Television Post-Production
- Video Recording
- Future Television Studio Design
- TV Image & Signal Evaluation Technologies
- Television Production

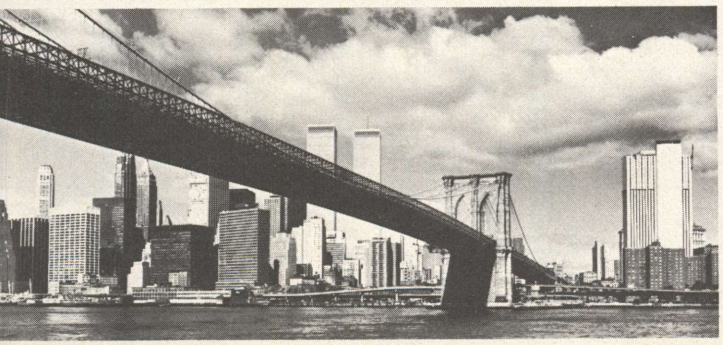
The motion-picture topics are:

- Laboratory Practices: New Film and Equipment
- Lighting/Projection Practices
- Motion-Picture Production and Special Effects
- Laboratory Practices: New Technology
- Film-to-Tape Interface
- Motion-Picture Sound
- Historical Papers

New Chairmen Named

Topic chairmen in the field of motion pictures have been appointed, it was announced by Program Co-Chairman for Motion Pictures, Donald F. Breidt, Novo Communications. The chairmen are: *Laboratory Practices: New Film and Equipment*, **Frank Hauser,** Guffanti Film Lab; *Laboratory Practices: New Technology*, **Paul Kaufman,** Du Art Film Laboratories; *Laboratory Practices (assisting)*, **Neal Pilzer,** Motion Picture Enterprises; *Projection Practices*, **Joe Kelly,** United Artists, Eastern Theaters, Inc.; *Lighting*, **E. Carlton Winckler,** Imero Fiorentino Associates; *Film-to-Tape Interface*, **Mr. Robert Lund,** Robert Lund Associates; *Motion Picture Production and Special Effects*, **Mr. William L. Cooper, Jr.;** *Motion Picture Sound*, **Peter Custer**.

In addition, **Steve Chamberlain,** Arriflex Corp., has been named Topic Chairman for *Historical Papers*.



View of Brooklyn Bridge and lower Manhattan.

SMPTE Conference Vice-President **Charles A. Ahto,** Tape Film Industries, announced the appointment of **Dorothy Eady,** wife of SMPTE Secretary **Harold Eady,** Novo Communications, as Chairman of the *Spouses Committee* responsible for putting together the Spouses' Program at the upcoming conference, and C. Bradley Hunt, Eastman Kodak Co., as *Display Chairman.*

Program Co-Chairman for Television **Richard Green,** CBS, announced his final appointment of topic chairmen on the television side with **Max Berry** for *Television Post-Production*.

View of exhibit at 1981 SMPTE Technical Conference.

Conference Activities

In addition to what is expected to be a first-class technical program, the SMPTE will feature a full range of additional activities. First, there will be the Equipment Exhibit, which will run from Tuesday, November 9th through Thursday, November 11th. More than 300 booths of motion-picture and television equipment will be displayed on the entire second floor of the New York Hilton Hotel. Most of the major manufacturers are expected to participate in this major film and video equipment extravaganza.

The conference, as usual, will also have an Honors and Awards Luncheon on Monday noon, a cocktail party banquet and dance on Friday evening, a coffee club Monday–Friday morning, and a full week of activities for spouses.

Information about the conference will appear in future issues of the *Journal*. Registration materials are expected to be mailed from SMPTE Headquarters some time in the late summer.

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is the importance of reliability and backup. Since much of our electronics had to be one of a kind, we had to bring more test equipment and spare parts than usual, but the parts we needed (that op-amp!) proved vital.

The final lesson was the importance of adaptability. All of the systems described had to evolve throughout the picture in response to unpredictable conditions. Al Miller's ability to design a complicated device and get it working reliably in as little as a day proved critical. And without Steve's ability to organize projects, and Rachel's ability to build them, nothing would have gotten done quite quickly enough. As for software, Susan Sitnek and Paul Johnson programmed with innovation and aplomb.

And on to the next project, dreaming of the day when everything is ready beforehand.

FRONT PROJECTION: FIREFOX

by DON TRUMBULL

Many of the cockpit effects shots of Clint Eastwood and his Russian adversary were a mix of rear screen process and front screen process. Shot through the cockpit enclosure, these shots utilized front looking, over the shoulder, rear looking, face on, and side looking angles, with sky, terrain, and clouds in the various backgrounds. Much of the film footage for these backgrounds was selected from organized passes made with a special 8-perf camera mounted in the nose of a Lear jet and another 8-perf VistaVision Astrovision camera periscoped out of the bottom of the Lear Jet. Some of the chase sequence backgrounds were shot with a boom-mounted periscope camera (8-perf VistaVision) which tracked though a miniature ice trench over 100 feet long.

Both process projectors were 8-perf VistaVision. The rear process projector was a Paramount rental used with a cockpit section elevated on a 12-foot platform in such a manner that a 20-foot boom keylight could be swung 360 degrees around the cockpit in sync with background roll and bank maneuvers.

The cockpit was then sectioned to allow us to shoot front projection close-ups. On FIREFOX, we used for the first time our newly constructed compact front projection machine, which gave us the capability to film in the restricted space of the cockpit, with a three-foot camera to subject distance. Again, we shot rear looking, ¾, and side shots using the swinging key light to match our background moves.

Another cockpit, mounted on a hydraulic roll, pitch, and yaw unit 16 feet off the floor, provided moves for another series of front projection shots. The projector-camera unit was mounted on a Chapman Titan crane to get rear, ¾, and side shots with roll, pitch and yaw in the cockpit section. The swinging key light again made the shots look realistic by matching the lighting to the movement of the backgrounds.

Later, for over-the-shoulder insert shots of the instrument panel and windscreen, the pellicle mirror in the small front projector was replaced with a front surface mirror, allowing us to use it as a rear projection unit. Further rear projection, on the instrument panel's rear view and radar screens, was accomplished with two 4-perf projectors of our design. All three projectors were synched to a Panaflex camera, which was sometimes hand-held, sometimes O'Connor mounted.

John Dykstra rode co-pilot in the Lear jet, directing pilot Clay Lacy in creating the many thousands of feet of film to suit the footage needed for process, and composite backgrounds for miniature shots.

Meticulous planning and storyboarding of every camera angle, months of filming air and miniature backgrounds, and composite optical preparation allowed the live action process work to go ahead beautifully. ■

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that Swiss cheese quality even when it wasn't full of people."

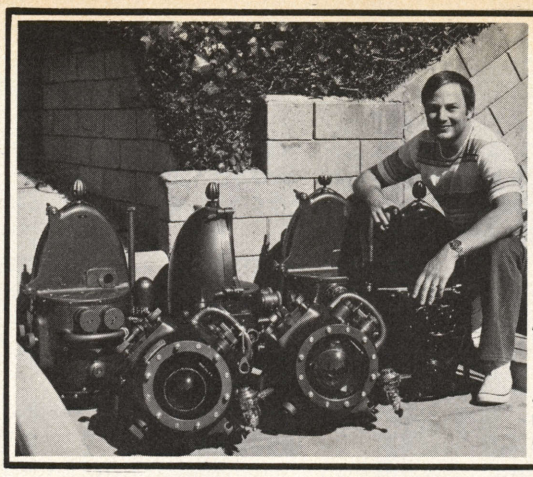
Boyle explains that the set had to be constructed more sturdily than the usual set because "we had people running up and down the stairs and as many people upstairs as down. One thing you don't do very often is have an upstairs and downstairs together, because it's difficult for the cinematographers to work on and anytime you get above the floor it's time-consuming, even if it's just a three-foot platform. It seemed important to us that you should be able to see all the doors, because that's what such a place is, and yet I didn't want it to look too much like a real brothel. My concept was that it was more like a girls' dormitory than a house of ill repute and we didn't want to dwell too much on what goes on there. Everybody knows that, so we didn't have to belabor that part."

Higgins adds: "It's sort of a Boy's Life version of a whorehouse."

"That's how this house came about," Boyle says. "The stairs were a kind of jungle gym for the girls, and then we had all the doors and rooms upstairs. We started in the early days with a photo on an easel of the original house, which was above a hardware store, then went to World War I, where we had the doughboys coming in, through World War II and up to the present, where Burt Reynolds comes in. We made an assumption that during World War II, when the Air Force and Army were down there, that the house got a little more affluent and added some rooms out back.

"We duplicated the front of the house on Stage 12, and the inside and back yard were done at the studio. They had no relation to the Murchison house or the Tommy Tune production. The big problem was to put dance numbers in a house that looked normal. The overall feel is based on realism in several ways because it's based on a story that really took place and the facts aren't embellished too much except that it *is* a musical and it is all for fun. There's nothing very serious nor can one draw any special morals or anything else except a lot of fun."

Higgins was anxious that the house should have "character," a personality of its own. "I'm not sure I gave it enough time to really assert itself," he says. "We started off with little trees,



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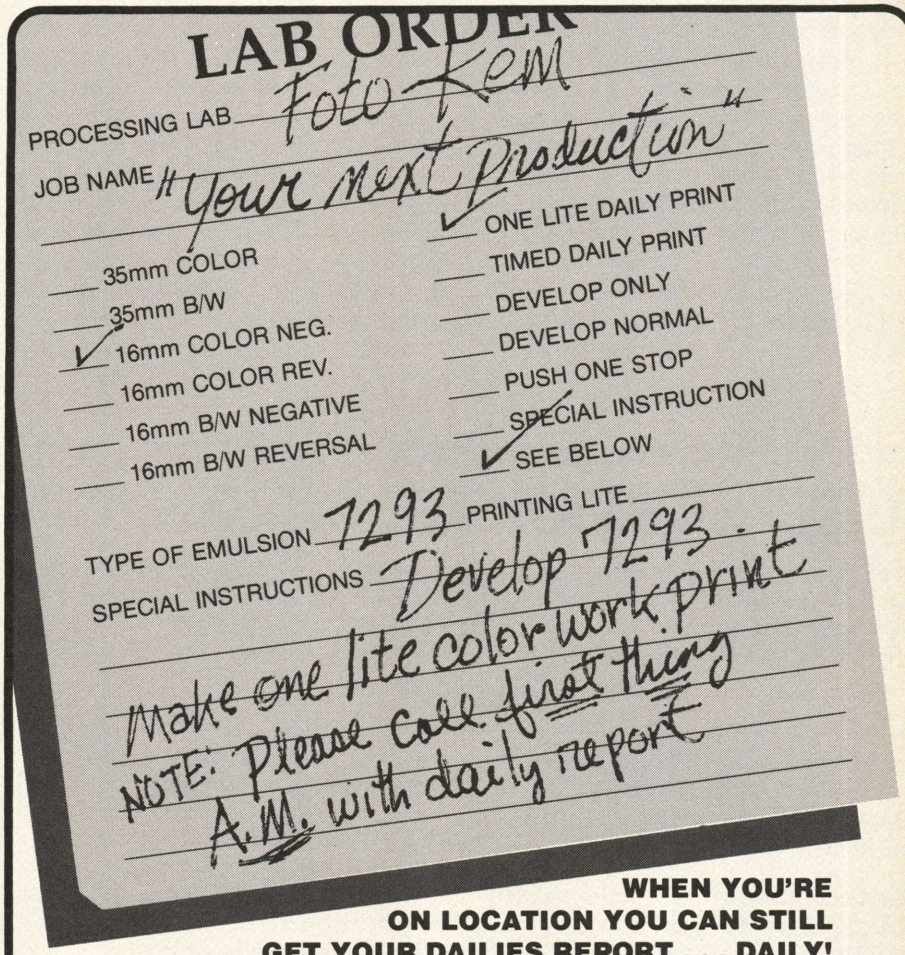

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so you could watch them grow along with the house. In the early part that interior changes about four times, with re-wallpapering, repainting, changes of furniture and so on. But you can see in some of the later shots that they didn't throw anything away—the pianola that is in the first scenes, for example. At the start there is that dark, Victorian look, and when Dolly came in she whitewashed the whole thing. It's a subliminal sort of thing. There's a lot going on that just goes over people's heads and they don't pick it out, but I think it's still worthwhile doing. Part of the joy of making movies is to know that there's a thought behind the whole thing."

Higgins and Boyle went to Lockhart, Texas, the town the previous director had selected. The courthouse, they felt, was not what was needed to contrast with the chicken house. They went to the Texas Film Commission for assistance in finding the most interesting courthouse possible. They settled on Hallettsville.

"An enormous Gothic structure out in the middle of nowhere," is how Higgins describes the Hallettsville courthouse. "Since the story is the fight between the courthouse and the chicken house, those two symbols were important points. They kind of match each other and in fact we dissolve out of one and in on the other. We matched those shots when we were planning the film."

Boyle agrees that "Hallettsville was a very good choice. All we had to do was add that pond where Dom DeLuise fell in, and of course we changed some store fronts and built the interior of Dulcie Mae's Cafe in an empty store. It was really touchy for a while, though, because in a small town the population is usually divided into two camps—the ins and the outs. So when a movie company moves in, particularly with a title about a whorehouse, the sides are drawn up rather sharply. In Hallettsville they were so sharp that for a while it looked as if we wouldn't be working there. It would have been a shame, because other towns didn't quite make it for us, particularly at that time of year when the trees are so heavy you sometimes can't see the courthouse.

"Because of the action we had to build that pond in front of the courthouse. The town almost exploded: we were defacing a monument! I told them that if they wanted a fountain we could make it permanent, or we could make it as a movie set. As far as cost to us was concerned it didn't matter—as a matter of fact, it might have been cheaper to have done it permanently. But no, no, they didn't want anything like that! Then the thing was built by very good craftsmen we brought in, and it was matched to the building to perfection. It looked like that pond had been there for 150 years. When the townspeople saw it, they were terribly disappointed they had insisted on it being temporary, but it was too late. It had to be destroyed."

Another location exterior was the sheriff's house. "We did a lot of helicopter looking and that's how we found the house," Higgins recalls. "We wanted a place with a country sheriff feel to it, a bachelor look, and a place for a horse in back. We lowered ourselves down and looked at 30 or 40 before we found the place we liked. We landed nearby and talked to the owners. The interior was set up on a sound stage."

Fraker was secured as director of photography early in the pre-production period, but was working on location on another picture. "Unfortunately, the production designer starts a long time ahead of the cinematographer," Boyle says with regret, feeling that an opportunity for the two to collaborate more closely in pre-planning would be of enormous benefit. "For one thing, the cinematographer is a very well paid individual and most producers put him on the payroll at the last moment. Bill was already working on another picture, but he did manage to join us in Austin for a while when we were scouting. He's very easy to work with and creates a very pleasant relationship.

"For this picture Colin wanted a very high key of light, probably feeling that the higher the key the brighter and lighter the film would be. One of the best ways to suggest lighting effects is not just through the sketches but by putting the natural light sources in place. What I like to do—and this is cheating—to suggest to the cinematographer how it feels when the set is lighted the way it should be, is to place the windows in the right places. For daylight, they have to be the source, although I've seen a lot of films where the light

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comes from Heaven knows where. And another is to have the night lighting lamp-lit, as you'd light a house.

"The house presented Bill with some real problems because it was a two-story house and he had not only the set on Stage 12 but the real exterior in Texas to deal with. But it's the house itself that's really the pivotal point of the picture. It became an actor, actually—or an actress. The real problem was to get together with the cinematographer, because all these elements had extremely restricting requirements, and since we were building the insides of a two-story house we had to be able to assure Bill he could light it. So, we took sections of roof out and made it so elements could be moved out if necessary, but in the main it had to be shot almost as you would photograph a real house."

Higgins found the widescreen format presented some problems. "It was the first time I'd shot in Panavision format and it's really kind of difficult trying to fill the frame," Higgins says. "It's great for the obvious stuff, the high shots and vistas, and since we had a lot of those and Texas is so big, we decided to go with it rather than 1:85 ratio. It just requires an extra amount of attention, which I wasn't always successful in giving. You can't storyboard every composition, and you can get thrown. You get up something that looks terrific in a wide shot and when you go in for the closeups you have to figure out what you're going to do with all the blank space. Sometimes we could work it out by cheating it around to put something in the frame or in the foreground, but a lot of times you didn't have anything in there when you did the master so you're stuck.

"We'd usually shoot dialogue scenes with a master and then cover it, but some scenes were trouble. Like the one of Burt at the table telling Dolly about the trouble at the courthouse, and they talk for a while and Jim Nabors comes in. It's about a page of dialogue. It looked fine in the masters and then we went in for the coverage and there's this expanse of blank around them. I had closed the door behind them with the idea that they wanted to be alone and so there was only a blank wall. Now I'd do it differently: I'd leave the door open behind Dolly and at least get a little of that Swiss cheese effect and make it more satisfying visually. The story is the cake, and that's what people are

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following. To make things visually satisfying is like icing the cake. I spend a lot of time telling stories and I think when you get better at that you look around and see all the things you can improve—including the composition.''

Higgins also found that the Louma crane requires some getting used to. ''Bill is a past-master of the Louma, having used it so extensively in 1941, and I was fascinated by what it could do. I also found out what it *couldn't* do. What I *wanted* it to do was to be on a flexible arm, but it's on a pole, so you have to find enough space to move the pole. If you get it inside the house and you want to track back with the camera on a pole, you have to take a wall out. We used it to come down the dining room table starting with Dolly and then all the way back again, and I can't think of any other way of doing that.

''And then there's a shot in the 'Hard Candy' number of Dolly coming out and singing to the girls and there's a chance to show the whole house at once. We used the crane a lot, and it was fun to use on the dances and it was the only way to do the capitol stuff, like that Busby Berkeley type shot where we stuck the crane right out in the middle of the rotunda from the balcony and shot straight down. It was the only way to do that scene in the rotunda where Dom DeLuise is on somebody's shoulders and we pull back from him and go on up on the same level with Charlie Durning on the balcony—I don't think you could do that without the Louma.

''We had a map of the capitol and we could say where we needed the Louma. Everything in the capitol had to be done at night—Bill was shooting night for day. Then there was the shot where Charlie disappears in the crowd and the camera swings up and suddenly we see him up in the dome. Well, the only way to get the dome was by shooting day for day, so that necessitated a completely different rigging. We did a little Steadicam work in the capitol, too.

''The first time we used the Louma was this: start in the trees, come down the side of the house, come across the yard, pull back to the girl in the swing—all in one shot. It was gorgeous, and I thought, wow! that Louma's great, and I said I wanted more. But the truth is, if you don't have a concept, if you just start to look for a pretty shot, you can just go anywhere with the camera, so we spent about an hour-and-a-half or two hours just looking for an interesting shot, just playing around with the crane. Finally I said we've got to stop this because we didn't get anything. It works if you design a concept and you design a shot, but if you go out looking for a shot (which you can do with a regular camera because you're limited somewhat), you've got it here and here and here and all over the place and you want to look at them all and soon you're knee-deep in possibilities of where to place the camera. I thought it was the answer to a prayer because you can get great shots out of the air with this machine, and then I found that it was just a machine. If you have a concept and idea, the machine will execute it for you. If you go to the machine and ask it to come up with a shot, it will present you with 900 possibilities. It was an expensive lesson.''

Multiple cameras were used on the Aggie dance and the locker room number. ''I don't usually like using multiple cameras because you're always compromising, but for big dance numbers they have a place,''

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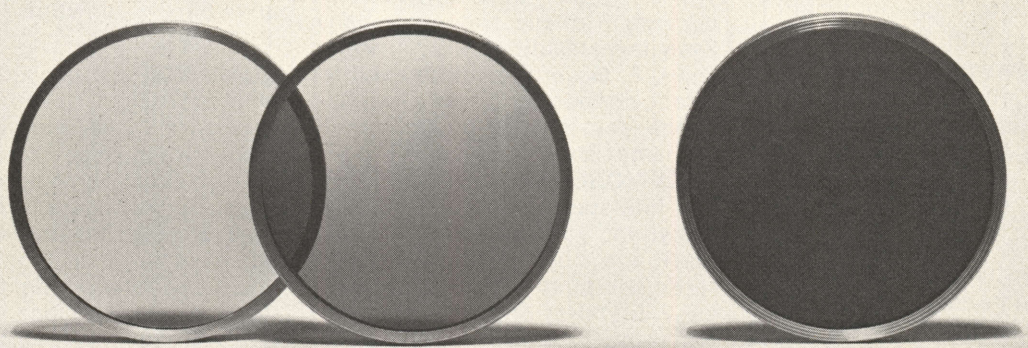

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Higgins believes. "In musicals you're always staging in large chunks and you can't always just go in and get other shots.

Higgins is wholehearted in his praise of the video monitor. "We had one throughout the whole shoot and it really is a wonderful aid. Initially I thought it was a bit of a crutch, and I still think you should look through the camera, but the convenience of just glancing at the video and saying 'okay, frame tighter,' or 'go in' is great. It's terrific for dance numbers, where you can watch the camera move and know whether you've got it or not. You can just run it back and see if you have any bad moves. For ordinary scenes I didn't play it back. Sometimes I'd check myself when we'd do seven or eight takes and I'd say which were best. You shouldn't watch the video for any kind of emotional scenes because you can't get the expressions and details that you can by watching it through the camera. But for something like the dance scenes, where you aren't quite sure whether they're off their marks or not, if's wonderful."

A highly effective sequence is a song number by Charles Durning in which, as an elusive Texas governor, he keeps vanishing behind the pillars in the capitol building and popping out again from behind other pillars where he could not logically be. The effect has been done often in cartoons and comedies, but in this instance it is done with the camera constantly moving to follow the action instead of the usual time-lapse technique with a locked down camera.

"We lucked out on that one," Higgins says. "It rained and we couldn't work. We had nothing to do except rehearse, so we worked out that elaborate number where Charlie disappears and goes back and forth. Normally, today, I guess you could do it with computers, television hookups and graphics a lot easier, but we did it as Buster Keaton would have. It was all just hold and cut with no opticals at all. What made it possible was a dynamite camera operator and a great dolly crew. We got up there on this rainy afternoon and plotted it all out, and the music guy handling the playback couldn't understand at all. I said just give us some places with blanks and start it up with clicks and stop with clicks and start it up with clicks again. Those blanks would be pulled out when Charlie would disappear, the camera would halt and Charlie would walk over to the other and when we heard the click we'd make another move. But it was tension ridden because the least little move would show. We could never have done it if we hadn't had this gift of a free afternoon to rehearse it, because we just made it up down there. We shot it the next day and we used the twelfth take.

Boyle recalls that one of the most difficult scenes one in which the trucks full of football players are on the way to the chicken house with a huge, setting sun behind them.

"It sounds like an easy thing," Boyle agrees, "You get a thousand millimeter lens and you go out and shoot a truck against the sun. But to find a road that goes right into the sun is very difficult. We had to get the sun plotted and get the exact angle within two days because the sun moves all the time and we figured we had a leeway of two days. I plotted when they'd have to shoot it and then we took the angle and moved it over the map all around Austin until we found a road about two miles long that seemed to fit. I hoped it was on a rise. I went out there one evening at sunset and, sure enough, there was a little rise and there was the sun right at the end of the road. We had looked at many roads that seemed okay, but when we had to pinpoint it right down to the day we were going to shoot it, they didn't work."

Higgins remembers the sun shot as "a kind of student film shoot. It was an added shot which was not on the agenda for the day, and we had two cameras. Billy kept walking farther and farther back and the sun kept going down and he'd keep saying 'further back, farther back,' and we got several good shots out of it."

Several scenes were enhanced by the special effects artistry of Albert Whitlock, matte artist and special effects director, and matte cameraman Bill Taylor. Boyle has worked with Whitlock often. "Whenever I have a problem I go to Al to talk it over. Usually, because I'm already on the picture, it will be my concept, but very often they are his. He was able in several instances to be very helpful on this film. I've worked with him on some—THE BIRDS, for instance—where he was almost the key, and some films at Universal couldn't have been made without him, such as THE HINDENBURG. Whatever he does is the best."

"One of the reasons to come to Universal is to get Whitlock," according to Higgins. "For the night shots he gave us the moon and starfield. He did the football stadium, the reflections on the glass of the announcer booth and the angles where you see the stadium. And for the night scene of Burt and Dolly by the lake, he painted in the whole sky and everything. That was an interior lake we built on the old PHANTOM OF THE OPERA stage."

Visually, the eternal problem of filmmaking is to combine intrinsic beauty with good storytelling. Higgins sums up the quandary:

"It's funny, you spend a lot of time planning interesting shots, but you really want the audience to *not get* an interesting shot. You want them to get whatever the shot is supposed to deliver." ■

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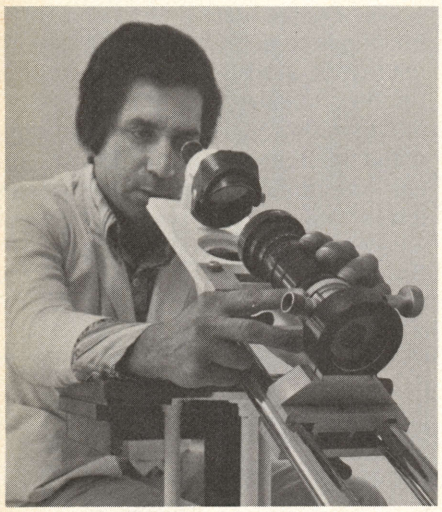

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Continued from Page 911

First of all the picture was designed as a vehicle for Burt Reynolds and Dolly Parton. It was to be marketed largely on the strength of their popularity so their fees constituted a significant portion of the above-the-line costs. Although Macgregor-Scott did not feel it was appropriate to comment on the salaries paid to individual actors, he did say that it is common knowledge that Burt Reynolds is one of the highest paid actors in the world and can command over $3 million for a picture.

The rights to the stage musical on which the movie is based cost $500,000. While this is a substantial amount of money, it is not an unusual price for rights to a stage play or musical. It certainly does not approach the figure paid for the rights to ANNIE, which Macgregor-Scott cited as $9.5 million. Generally the deal for the rights includes a provision for increasing the fee in accordance with the success of the stage version. The stage version of THE BEST LITTLE WHOREHOUSE IN TEXAS enjoyed considerable success, but it was not considered to be in the same league with ANNIE. The $500,000 figure for rights to BLWIT represents the maximum payment required.

Originally the writers of the Broadway play, Larry L. King and Peter Masterson, were engaged to adapt the play to the screen and direct it. Burt and Dolly were cast, locations were scouted in Texas, sets were designed and a staff was engaged in preparation for a September 1980 start. Set construction began, and then the production was shut down because of the Screen Actors Guild strike. During the hiatus the concept of the movie was revised and a decision was made to engage Colin Higgins as writer-director. As a result there were "buy-out" fees incurred with the initial writers and director plus additional fees for the re-writing of the script. The original budget for the film in 1980 had been just under $20 million, and the difference between that figure and the final budget was largely a matter of costs incurred because of the change in the concept of the picture plus inflation and union rate increases. The new concept for the picture involved redesigning the set for the chicken ranch so that some of the set construction costs which had already been incurred had to be repeated when the picture resumed production. (Set construction costs are a below-the-line expense.) The fact that Higgins is a much more successful writer-director also increased the size of the fees in this area of the above-the-line costs.

One aspect of the above-the-line cost which is related to the fact that the film is a musical is the cost of rehearsals with the dancers. The dancers included the 15 girls who live at Miss Mona's chicken ranch and 22 Aggie football players who celebrate their victory with a visit to the ranch. The girls began rehearsing six weeks before photography began and were on salary for about 17 weeks altogether. The Aggies were on salary for about 11 weeks. Many of the dancers cast in the film were not from Los Angeles so that there were transportation and lodging and per diem costs for them for the entire period rather than just during the time the production was on location in Texas. Macgregor-Scott points out that fringe benefits for people working on a film can be as high as 41% and estimates the average total weekly cost to the production for a dancer to be over $2,000. With 22 dancers for 11 weeks and 15 dancers for 17 weeks this would amount to almost $1 million of the above-the-line costs. In addition to the dancers themselves there were the choreographers and rehearsal musicians who had to work with them, so that Macgregor-Scott estimates that there were as many as 50 people on staff during the production purely for the dance numbers.

The above-the-line cost also included the salaries, fringe benefits and expenses of the rest of the cast. There were 13 principal players in addition to Burt and Dolly and there were some 28 other bit players plus the extras.

To some extent it is possible to analyze the below-the-line cost on THE BEST LITTLE WHOREHOUSE IN TEXAS in terms of pre-production, production and post-production expenses. Macgregor-Scott figures that about $4 million dollars had been spent below-the-line before the company actually started filming. About 30% of the below-the-line budget went to pre-production, 55% to production and 15% to post-production. The pre-production expenses include all of the design work for the costumes and sets as well as most of the set construction. The construction costs for the sets came to almost $1 million. The chicken ranch was of course the most expensive set with

$341,000 in construction costs plus another $70,000 to $85,000 in set dressing (including labor). There were only two practical interiors on location: Dulcie Mae's coffee shop and the lobby of the capitol building. All of the rest of the interiors were shot on stage. Some of the sets were designed to make use of existing material in the Universal set department such as the woodwork in the governor's study. Most of the sets except for the chicken ranch were relatively straightforward from a construction point of view. Needless to say with Robert Boyle as production designer and Theadora Van Runkle as costume designer there was no attempt to skimp on the design aspects of the film.

Another major cost incurred at least partially during the pre-production period is the music. Music rights and all the costs associated with composing, arranging and recording the music are below-the-line costs. The music costs for BLWIT were just over $1 million. Much of this was incurred during pre-production since all of the musical numbers were filmed to play back, but a significant amount of re-mixing and re-scoring was also done in the post-production period due to changes in the editing of the picture. Music is one of the areas where the actual costs exceeded the budget by a significant amount because of the additional work during post-production. Some of the recording sessions involved an orchestra of 55 to 65 players.

The production period consisted of 78 days of first unit photography with 2 days of second unit work followed by 10 days of additional photography during the post-production period. Of the 10 days additional photography 8 were devoted to shooting the main title sequence on the stage and had been scheduled from the outset. The other two were devoted to shooting the on-camera narration which was a concept that evolved during the editing of the picture. The company was on location for 5½ weeks and Macgregor-Scott figures that a location shooting day cost about $72,000 or $100 a minute, as he puts it (assuming a 12 hour day). This is a figure based on the crew salaries, fringe benefits, per diem, lodging, meals, equipment rental, location fees, vehicle rental, etc. In comparison he reckons it cost about $60 a minute to shoot on a stage. The crew consisted of over 70 people.

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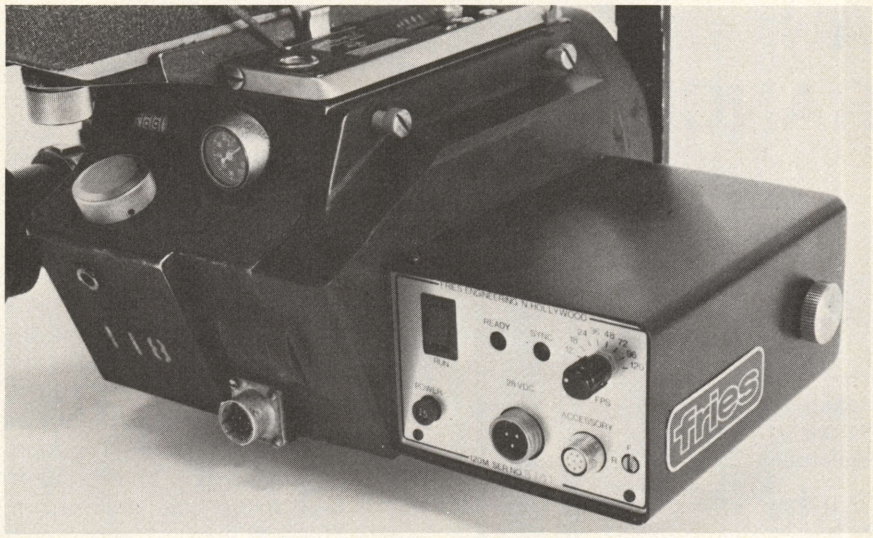

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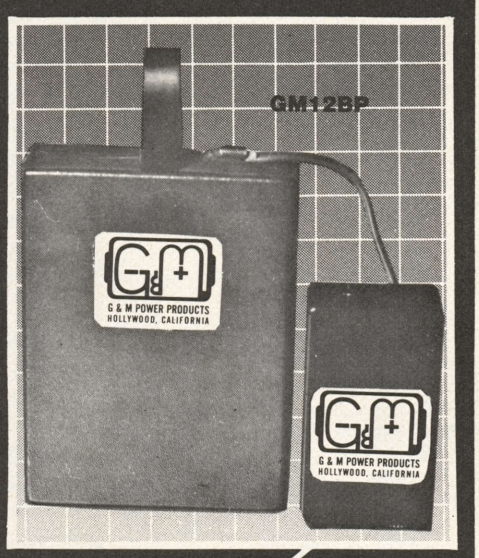

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Perhaps the most unusual aspect of the location photography was the work inside the capitol building. It was only possible to get permission to shoot in the building at night and on one Sunday. As a result it was necessary to light the interior of the building to look as though daylight were coming through the windows and glass doors. Since the building is 196 feet tall and the portions used for staging the dance numbers were in the lobby and balconies under the rotunda, the task of creating the daylight effect was formidable. The one shot of the rotunda itself was shot on Sunday during the day with actual daylight coming through the windows, but the other scenes were filmed at night and lit to match the look of the daylight. What it took to accomplish this was six days of pre-lighting with a separate crew equipped with two 40 ft. electrical trucks, four generators, twenty 10K's, 8 arcs, an assortment of floor equipment and 20 x 40 griflon reflectors for bouncing light through the doorways visible at the ends of the halls. Bars for rigging light were put up behind every available beam or archway, and the lighting set-ups were designed so that they could be left up as much as possible during the day without creating hazards. In the end it required about 1½ or 2 hours every evening to finish installing the lighting and a similar amount of time to wrap the equipment which had to be removed for normal daytime use of the building.

Another unusual aspect of the production was the use of the Louma crane both on location and on the stage. Macgregor-Scott says that the Louma crane enabled them to get shots in the capitol building that would have otherwise been impractical, but that its use requires careful scheduling so that production time is not eaten up by moving the crane from one set-up to the next.

Approximately 500,000 feet of film were shot on THE BEST LITTLE WHOREHOUSE IN TEXAS, much of it in covering the dance numbers. Macgregor-Scott figures that the crew averaged about 12 set-ups a day, yielding an average of 1½ minutes of screen time per day. Some days would result in much more screen time such as the five minute scene between Dolly and Burt beside the lake which was shot in one day. The dance number in the locker room was filmed in 3 days after the dancers had rehearsed for 14 days on the completed set while other scenes were being filmed. Extensive rehearsals of the dance numbers on the sets enabled Higgins and William Fraker to plan the lighting and photography of the dance numbers in advance.

The production of THE BEST LITTLE WHOREHOUSE IN TEXAS stayed within 3½% to 4% of its budget all the way through the completion of principal photography and part of the way into post-production. Some areas in post-production went as much as 35% over budget primarily for two reasons. The most important was probably the additional work on the music done during post-production. The second reason was a time crunch resulting from a release date commitment which could not be changed even though the production had been late getting started. Even at the outset it was realized that the post-production schedule would be very tight, and it was planned to have four editors working simultaneously on different portions of the film. When the start date had to be pushed back a few weeks and the release date could not be changed, it meant that the only solution was going to be substantial overtime work during the post-production period and perhaps even more personnel. A fifth editor was in fact hired, and the last editor finished up the night before the film was shipped to its premiere.

All of the post-production work was completed in about six months. There were six weeks of editing before the main title sequence was shot and there were probably three weeks worth of temporary dubbing done during the editing. The final dubbing took six weeks plus an additional three weeks to mix a magnetic stereo version of the film. There were several matte shots done by Albert Whitlock mostly while the film was still shooting.

The studio overhead charge at Universal where the film was made was 25% of the below-the-line costs. This amounts to over $2½ million on a picture the size of THE BEST LITTLE WHOREHOUSE IN TEXAS. While Macgregor-Scott concedes it is hard to get your money's worth for the overhead fee on a large budget picture, he is quick to emphasize that the overhead fee does cover some valuable facilities and services which are available to a production at the studio. Most importantly the production tied up four sound stages for nine months, an item which would have

been a significant figure in the budget had it not been included in the overhead charge. The services of the legal and accounting departments at the studio are also covered by the overhead charge as well as the office space and the editing facilities. Basically every facility or prop or set within the walls of the studio is covered by the overhead charge and only the labor costs of using them are charged directly to the budget. Macgregor-Scott also says that the rates charged by the special effects department are much less than it would cost to have comparable work done by an independent contractor.

Macgregor-Scott developed what he describes as the first proper accrual accounting system for film production in order to monitor costs during the production of BLWIT. Whenever something was purchased for the production it was immediately entered as an expense rather than waiting for the bill to come in. Instead of having every department make their own purchases independently, he set up a purchase order system so that every purchase went through his office. In this way he was able to prevent duplication and to monitor costs on a daily basis. When, for example, the wardrobe costs seemed to be approaching their limit and an estimate for 50 pairs of boots to be manufactured specifically for the film came across his desk, he was able to get involved and make a deal with Justin boot company to buy boots off the shelf at cost thereby saving perhaps $3,000 or $4,000.

The below-the-line cost of making THE BEST LITTLE WHOREHOUSE IN TEXAS is largely a function of its visual style. Consider for example how it would have looked if the play had simply been videotaped on the stage. Ideally every dollar spent on the production of the film can be related directly to a difference in the way the film looks and the way a videotape of the stage show would look. For the opening number rather than just seeing the chorus standing on stage singing about the history of Miss Mona's chicken ranch, we see a very elaborate (and presumably expensive) montage of scenes at the ranch over the past 100 years. There are details in this montage which may only have a subliminal impact such as the difference in the look of the kitchen for the house in 1918 and 1943, and it is clear that the richer the visual content of this montage, the

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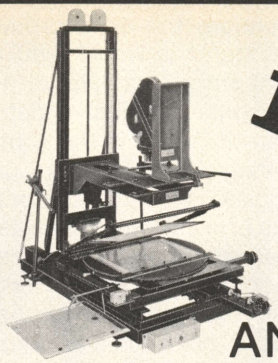

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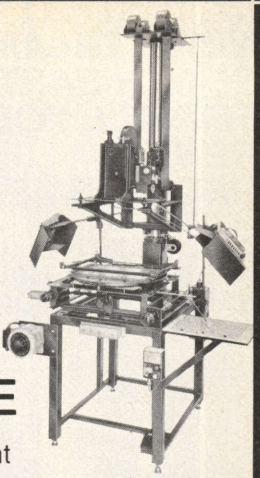

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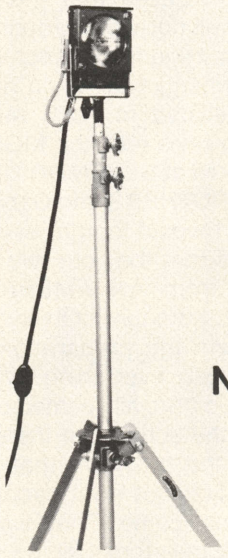

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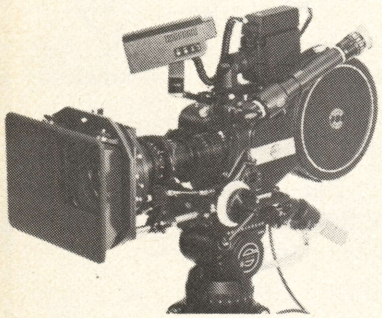

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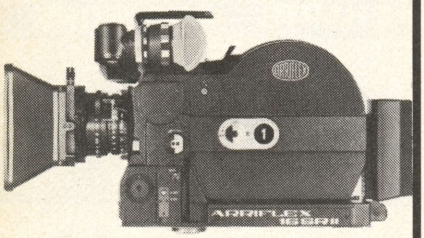

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more it costs to execute. The shorter the vignettes, the more set-ups (and therefore the more production time) the montage would require.

Another example of the way in which the visual style determined the cost of BLWIT is the shot of the sun setting behind the truck on which the Aggies have hitched a ride after their bus broke down. This was not a shot that just happened in the course of shooting. It apparently originated in a storyboard drawing for the sequence, and a great deal of effort was expended finding a road which would permit the shot not to mention actually setting up in time to get the shot on the day when it had been scheduled.

Macgregor-Scott was production manager on ANIMAL HOUSE which he says was shot in 30 days with an average of 31 setups a day. He knows what it takes to shoot more quickly and he is certain BLWIT could not have been shot in 30 days no matter who was doing it. That is to say it would not be possible to shoot the *same film* in 30 days. It would certainly be possible to shoot some kind of film adaptation of the stage play in 30 days, but it is difficult to imagine exactly what it would look like.

Hindsight may appear to reveal ways in which substantial amounts of money could have been saved on the production. For instance, there were two musical numbers cut from the film in the editng. The question is how one is able to foresee that the musical numbers will not work properly in the edited film. Higgins comments: "I remember when I was doing research. Once I decided to do a musical, I wanted to review all the MGM musicals. I looked at SEVEN BRIDES FOR SEVEN BROTHERS and Gene Kelly's musicals. I would look at everything. And I read that they cut two musical numbers from AN AMERICAN IN PARIS and I thought, 'Obviously they hadn't done the preparation. We're storyboarding everything.' Well, the musical numbers all seemed perfectly logical in the script, but there was a sense at the previews that the audience just did not want a song where two of them came. They wanted to get on with the story. One was a song right after Burt calls Dolly a whore. It's a song about how he's ashamed of what he said and how he really loves her, but he can't say 'I love you.' It's a song Dolly wrote for him, and he sang it terrifically; but it just sat there because everything the song said you saw in his face before he left her room. You saw that he was sorry, that he's shocked, that he loves her and can't say it. Everything was in the closeup. You see it and say, 'OK, so what's gonna happen now?' Well, we don't want a replay of that emotion in a song, and that's what you're always up against."

The other song was one that Dolly sang and related to a sub-plot of a new girl arriving at the house. The sub-plot was eliminated in the editing because it did not pay off adequately and eventually the song was eliminated as well because it seemed to delay the start of the conflict in the story.

In general Higgins found a musical to be a very demanding form of filmmaking. "I can see why they don't want to make them. I can see the problems involved, why they all are expensive, why they all will drive you crazy, because they are real tough to do. You have to plot out the things so carefully—like doing all the storyboards and staging and rehearsals; and then you get on the set and you still want the flexibility of the moment so there are changes and regroups there. And then you get to editing and you find that the freedom you expect from the film, to cut more or less wherever you want in terms of just the visual image—you find you can't do that. You can't cut in the middle of a speech. You want to remove a line of a song or want to remove a verse, but you can't without taking a chorus as well. It's a complicated sort of production which in our case was insane because we started two months later than we projected so it all came out in post-production."

One key to the cost of THE BEST LITTLE WHOREHOUSE IN TEXAS is implied in the term "flexibility." The production was scheduled to allow for the possibility of changing things on the set. The sets themselves were designed to permit the maximum number of possibilities in terms of staging and camera angles. Macgregor-Scott contrasts the tendency in set building today with the way Hitchcock used to work: "Hitchcock only built just the set he was going to shoot." He says however that he does not know of a single director today who can pre-plan that effectively. On THE BEST LITTLE WHOREHOUSE IN TEXAS the entire interior of the house was built and every room was used, but it was more a matter of finding a way to fully

utilize the set than building a set according to the requirements of a shot list. For example in planning a montage sequence towards the end of the film, the decision was made to go ahead and spend $300 wall papering one final room which had not yet been used for anything so that it could be used for one shot.

The assumption is that the more flexibility you can give a director in shooting a film, the better the film is likely to be; and in most cases this is undeniable. At the same time Macgregor-Scott insists that pre-production planning is always cost effective. He says he has never seen a film that was over prepared. Obviously the more things can be mapped out ahead of time, the more efficient the production time can be, and it is usually only the commitment to a release date and the limited availability of the people involved that make productions start shooting with less than the optimum amount of planning. Different directors also work in different ways. Macgregor-Scott had not worked with Higgins before, but he had had a chance to observe him on the set of NINE TO FIVE. From a couple of days of observation he was able to get a sense of his working method which helped him estimate the amount of time that would be required to shoot the more elaborate action sequences or dance numbers. He could tell how much he liked to shoot in sequence and whether he was able to shoot everything from one direction before changing the lighting to shoot from the opposite direction, etc.

A corollary of maximum flexibility is the concept of ''coverage'' not only with regard to footage shot but also in areas such as set design, props, wardrobe, extras etc. Every number of a department has a tendency to want to avoid embarrassment by covering himself: i.e. bringing along a selection of props in case the one he deems best is not to the director's liking or providing extra wardrobe in case there is a problem of some sort or having more extras available to fill in the background in case the director decides to shoot a wide shot, etc. In many instances the availability of these resources may prompt the director to shoot something that he otherwise could not have shot, and the film may be better as a result. A lot of coverage of this sort however simply stems from the impossibility of making all of the necessary decisions

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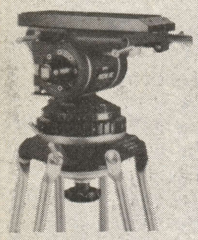

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in advance or from the difficulty of communicating stylistic preferences in the pre-planning stage.

The same thing applies to coverage in the sense of footage shot and angles from which a scene is filmed. The more angles the director shoots, the more flexibility there will be in the cutting room. The tendency to postpone decisions is partially a recognition of the fact that it is extremely difficult to assess the impact of a shot without seeing it in the context of the other shots with which it is to intercut. As a result a film like BLWIT has a shooting ratio of 45 or 50 to 1, and as Macgregor-Scott puts it shooting 500,000 feet of film "is not that much anymore."

The cost of THE BEST LITTLE WHOREHOUSE IN TEXAS is a product of the working methods, the visual style and the salaries of the personnel. It is probably fairly typical of a conscientious first class Hollywood production today. Obviously we have only been able to scratch the surface in terms of the factors determining the cost, but perhaps this overview can provide the starting point for exploring in more detail specific questions, such as when it becomes cost effective to shoot on a stage rather than on a practical location or how you can analyze production costs in terms of what the audience sees on the screen. ■

Cinema Workshop
Continued from Page 868

persion properties. Notice that the edges and corners are well rounded. Molded rib protrusions protect the hardware and an aluminum frame maintains alignment. I recommend a full length piano type hinge for strength. The casters pictured are a nice feature but remember it is absolutely mandatory to remove them before shipping. If the case is dropped on an unremoved caster, it can be driven like a spike into your equipment.

When packing cases into a van or trunk, try to lay all cases on their largest dimension so as to take up all available floor space. This keeps units from sliding back and forth around turns. A loose case in a trunk or van can receive a tremendous impact as it slams into the side of the vehicle upon cornering or braking.

Lastly, always tip the skycap well. It might be your best insurance investment. ■

Talking Technically
Continued from Page 872

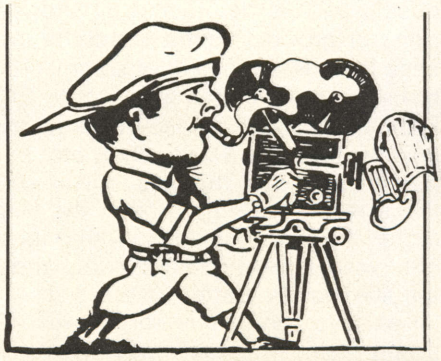
is necessary to remove the motor drive belt and if this is not replaced with knowledge the camera will not always subsequently stop with the shutter in the view position. As already mentioned, the back cover should not be removed from an Arri 35BL without prior instruction because if it is not put back with a great deal of expertise the camera may become noisy.

An electronic fault in a Panaflex camera can usually be cured by changing four plug-in electronics boards situated two on either side of the motor. To gain access to the electronics compartment a special key is supplied and camera assistants should make sure they are properly briefed on the various procedures before they take a camera out. Looking at the four boards left-to-right they are Power Supply (96-952), Camera Drive (98-525), Crystal/Tachometer (96-251) and 'Catch-All' (96-957).

A spare set of boards is supplied with every Panaflex camera but should not be used until all other possible causes of camera malfunction have been eliminated and if a spare set does have to be used the original set should be returned to base together with a full report of the problem so that a replacement set can be supplied.

The next thing that can happen to almost any camera is that the mechanism completely seizes up, probably because it hasn't been oiled at the prescribed intervals. The only camera I know that is manufacturer-lubricated for life is the 2000+ fps Photosonics 35mm-4B. All others need a touch of the oil can sometimes every shot, sometimes every day and sometimes once in a while.

In-field camera lubrication was a subject I wrote about in the March '81 edition of the ACM. Cameramen ignore it at their peril. ■



happened to my film?"

And they say, "Well, Billy, we had a late run, and we had a problem, and it's not going to come off..."

I'm on my way at seven o'clock back to San Francisco and I need to know. He says, "Call me as soon as you get up there." So now I get on a plane—I have to worry about taking off and landing, let alone what's happening at the lab, right? And so I get up there and I rush to the phone and they say, "Billy, there's a phone call waiting for you from the lab." I say, "Uh" I don't want to hear it, right?

I take up the phone, it's Skip (Nicholson at Technicolor). He says, "Billy, it's gorgeous. It's gorgeous!" I say, "Terrific." I go back, I walk on the set—we're working because we had a previous set-up—and Warren comes in and I say, "Warren," he says, "Yes?" and I go (grips one elbow in an "Italian salute"). He goes, "What's wrong?" I say, "Nothing, I love ya, everything's beautiful." He says, "I knew it'd be beautiful."

So there you are. You want to be a cinematographer?

1941 is a picture that I really take a lot of pride in. I was on this picture just over a year, from the time we started to the time we finished. We did an amazing amount of tests on this picture, and I think that's what it's all about. Even now I find, in doing commercials, that if some of the houses have a problem they'll set up a test day.

I just finished one commercial for a game called Activision. It's about a man coming home, throwing his keys on the desk, scaring the cat, not even turning on the lights, sitting down, taking something out of a package, and slamming it in the tv set. All of a sudden he's sucked into the tv set. The major problem was trying to find the right density that they could work all around for the impression of the wind and the light sucking him into that set. The point is, we did a test day, and I find that's where the real value is, that's where you really learn.

I do tests not for what we know we can do; I do tests to find out what we can't do. How much you can push the film, what light level you can really work at, what looks good on a lady that is 35 or 40 years old, and her face is going to be 40 feet high on the screen, and you're in very low light level, and she needs to be helped a little bit because of a few wrinkles, and how you can deal

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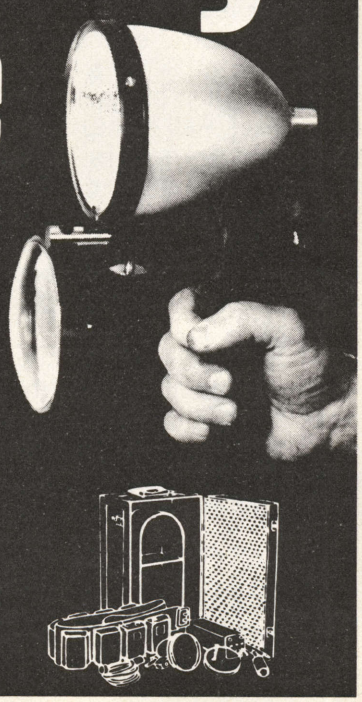

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with those low, low light levels to make her pretty and keep that beauty consistent throughout. I'm somewhat of a romantic and I really believe that anybody you photograph in Hollywood should look absolutely beautiful, male or female. I want the people to look pretty. I want people to go to the theater to escape. That's my philosophy.

In 1941, in order to reproduce what you're going to see on that screen, you'd have to build a set that would have cost another 35 million dollars, so they built miniatures. We built two sets of miniatures: we recreated the amusement pier between Santa Monica and Ocean Park, and we recreated Hollywood Boulevard. We have people standing against those miniatures, firing at an airplane coming down Hollywood Boulevard, and I defy you to say that those were miniatures. They took on a life of their own.

(Seven-minute clip of 1941, directed by Steven Spielberg, 1978. In this sequence, a Japanese submarine off the California coast fires on an amusement park, and the ferris wheel rolls down the pier and into the sea.)

If you notice the shots cutting back and forth between the miniatures and the submarine, you'll find that the smoke density is somewhat even behind them. And that's what keeps the reality going. I get the smoke up to certain point, and I say, "Roll 'em." If those operators are saying, "Billy, the smoke's no good," I say, "Okay, stop it." But if they let it go through once I say, "Okay, we're going to go," then it's their responsibility to watch everything that we set up for.

When I set up a shot and I'm working with the director, I want to spend my time with that director. I want the operators right behind me, and I want them to know what I'm doing, and where I am, and what I'm dealing with. And at the point the director says, "Billy, I need...' I say, "Dickie, take over." And, boy, he'd just better keep it well greased and going, or else he's not coming back the next day.

I'm pretty heavy on the crew. I demand the attention and the dedication, and I demand that they accept responsibility or they don't work for me. They're getting paid x amount of dollars—and I don't care what they're being paid. They say, "I want five million dollars a day," and I say, "Okay, you got it." I go in and fight for that. But, by God, you'd better earn it. There's no fooling around. Once we go on a set, it's all business. Because I have taken on the responsibility of doing that picture for x amount of time and x amount of dollars and it's my reputation that's involved, so I'm really tough on the crew. I love these guys, don't misunderstand me. I've had the same crew with me for almost ten years. But there's no fooling around.

(QUESTION FROM AUDIENCE: Did you shoot the effects stuff and the principal photography at the same time? The lighting is so well matched I assume you were D.P. for both units.)

Yes, absolutely. When we started doing the tests, I said to Steven, "Nobody else can do this. Once we start, we've got to keep the same team all the time in order to make it work." I don't know how else you do it because you can't have two different thoughts working.

No, we didn't shoot them at the same time, but yes, we did control it. And we had the same people. We had this Navy fogger again. We'd say, "Okay, give us eight seconds of smoke." And then they'd turn it on, fire it up, and they'd give us eight seconds of smoke. Then we had two huge fans and we blew that smoke up to the ceiling and spread it around up there, and then the weight of it brought it back down. Once it got down, because the stage doors were opened and closed, opened and closed, the density of the air changed. So then I'd look at it and say, "Okay, turn the blowers on, let's start sucking some of this out." They'd suck it out, suck it out, and finally I'd say, "Okay, ready." And we'd shoot. That's how we did it, and it was tedious.

I worked and worked on Hollywood Boulevard. I think we'd worked for about six hours and I finally said, "Okay, we're ready. Hit the smoke." Then I said, "Okay, suck it out, suck it out..." We started thinning the density to where we liked it. All of a sudden the phone rang and somebody said, "Mr. Spielberg, you have a telephone call," and he said, "I'll be right back, Billy."

I said, "Okay." We're sucking it out and sucking it out and, all of a sudden, it's perfect and I said, "Okay, we go. Where's Stevie? Stevie! Stevie!"

He said, "I'm on the phone."

I said, "Oh Jeez." And after working six hours, I went crazy, stomping around. And I went out to the truck and got a gin and tonic, felt better, came back, and Stevie's still on the phone! Now I'm ranting and raving. Now I'm chewing out the assistant director.

He says, "Billy, what do you want me to do? Pull him off the phone?"

"I don't care. He should be here." All that stuff. All that baloney.

He comes on. He says, "Now don't chew me out, Billy. Don't chew me out."

I say, "But..."

He says, "Wait a minute. I was just talking to Francis Coppola."

And I say, "Oh."

He says, "He wants to buy a studio! And he wants to borrow a million dollars."

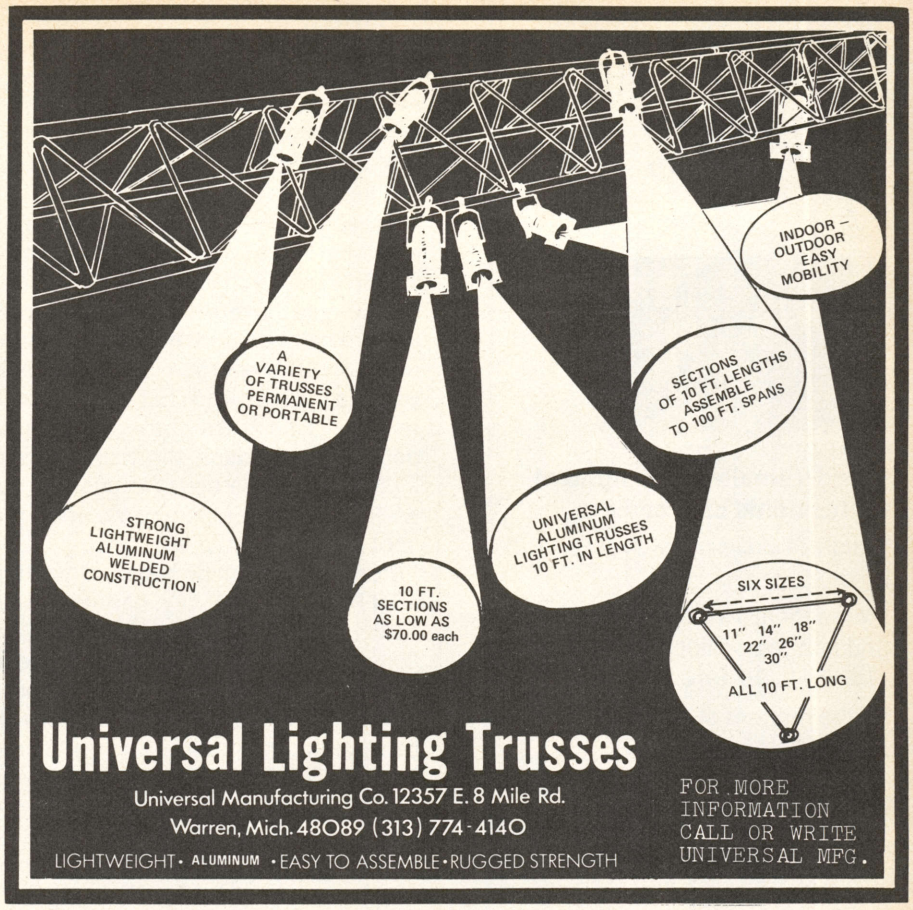
I love that! And I say, "Well, you got me now. So let's sit down and talk about it." I love it. It drives me crazy. Because they talk in millions, right? Well I don't know if Steven invested; I don't believe he did. And Francis went on to buy Zoetrope which was General Service Studio—the studio that I started at in Hollywood—and Francis bought it and made ONE FROM THE HEART. From that point on, anytime Steven was on the phone, I said, "Forget it. Okay, take your time. Another million dollars."

The people I'm talking about—Steven Spielberg, Warren Beatty, Richard Brooks, Francis Coppola, Roman Polanski—those are heavy, heavy dudes. They're marvelous, fantastic people, really dedicated to what they're doing, and each one is different. I have a story about three different directors: Coppola, Polanski and Brooks.

Francis Coppola directs so that at the end of the picture you are blown back; you are overwhelmed by what he does to you. He'll take a whole audience and blow them back. And he directs with those kinds of dynamics.

Roman Polanski is much subtler: he will lead an audience by the nose to any part of that theater he wants to. I did a picture with him called ROSEMARY'S BABY. He has a scene where Ruth Gordon comes in. John and Mia have just finished their apartment and Ruth wants to get in to meet Mia because she wants control of the baby they're going to have. Mia's got the chain on the lock, she opens the door, and Ruth starts to walk down the hallway.

At the time, we used hand-held cameras, and we built an H-bar out of wood—we didn't have Steadicam or anything—and David Walsh, the camera operator, hand-held it, this Arriflex. And we brought Ruth and Mia all the way down the hallway. And in those days we worked with translight backings. You had to have something, a mullion or a door, to hide the blending of the two translight backings back there so as you panned by you could move from one backing to another.



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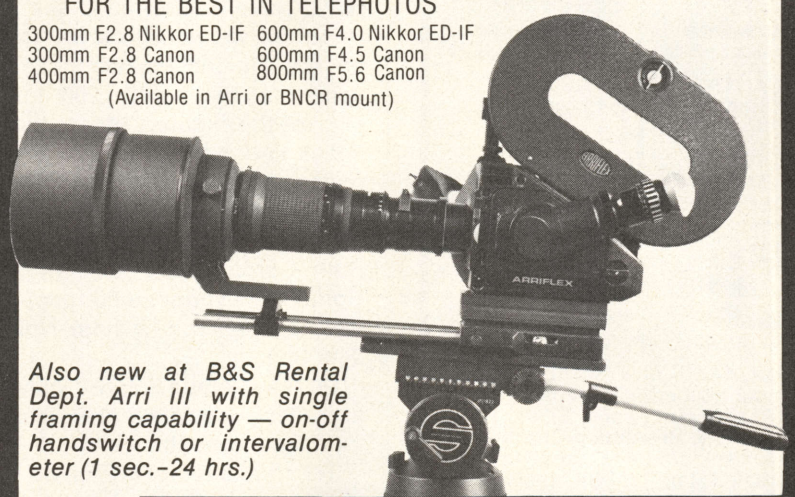

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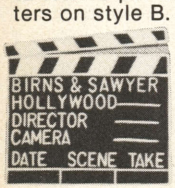

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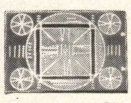
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Anyway, David is bringing them all the way down. They go into the front of the room, Ruth Gordon is leading, close, saying, "Oh my goodness, isn't it marvelous what you kids have done to the apartment." And Mia is looking strange, like what is with this woman. And Ruth says, "Where's the phone? and Mia looks around and she says, "There's one in the bedroom."

Now you have a doorjamb, a doorjamb, a hallway, and they're in the front room and the bedroom's in there, and you see the bed. And Ruth says, "Okay, terrific." She goes through the two doorjambs, through the hallway, and sits down on the bed. We push in, we walk in close to Mia, and we end on a shot like this: cut, print.

"Beely, Beely," he says, "I want a shot P.O.V., Mia's P.O.V. of Ruth." I say, "Okay, terrific. Give me 20 minutes." So 20 minutes later, I say, "Roman, we're ready." He looks through the camera and he sees: wall, doorjamb, hallway, bedroom doorjamb, the bed and some furniture in the background. He sees Ruth Gordon framed perfectly in the second doorjamb. Terrific shot.

And he says, "No, no, Beely."

"No, no? Alright, what?"

And he says, "Move the camera to the left, move the camera to the left, move the camera to the left..." Till you can only see half of Ruth.

And I say, "You can only see half of Ruth!"

He says, "Exactly."

I say, "Okay. That's the way you want it to be, okay. You're the director." We shoot it. Dissolve.

Six months later, I get a call and he says, "We're going to have a preview, Billy. Come on down and see the preview." So we went to a preview at—I believe it's the Pickwood Theater—something that holds 1,200, 1,500 people. See the picture. Come to the scene: knock, knock, hello, the apartment, she opens up, come on down, hand-hold all the way back, where's the phone, the phone's in there, push in on Mia. Cut to Ruth Gordon. You see half of Ruth Gordon. But you see 1,500 people all go (craning neck to one side). Now *that's* directing.

So I say Roman Polanski can take an audience and actually move it back and forth, he moves them all over.

The thrid director is Richard Brooks, and I got to tell you, the man is extraordinary. Francis directs a picture and he overwhelms you; Roman directs a picture and he leads you; but Richard directs a picture and you feel the weight of that picture. At the end of a Richard Brooks picture the audience are like this on their seats. And it's marvelous.

We were talking about ROCKY III the other night. I saw ROCKY III. I was in the back of the theater, the Pixy. I always go to theaters on the street because I've got to see what the audience wants; that's what turns me on. In ROCKY III you're going to see a growth from ROCKY and ROCKY II. In the first picture the texture was sensational and you felt the emotion. But here the guy gives you the same feeling, the same texture, but beautifully done. I was just so proud of him, and I don't know him. But it's a marvelous opportunity for people to study three films in a row, and see what happens, how much you can grow, how much he's learned. And I was clapping. I love the picture.

On GOODBAR, Richard said to me—and that's what I love about him—he said, "Billy, we're going to do something on this film that I don't think we've ever done, either you or I have ever done: we're going to make this film completely suggestive. We're going to use black and white, coloring, we're going to shoot color film, we're going to sue light and shadow, and I don't want to see anything. I don't want to see any insertions, I don't want to see any pubic hair, I don't want to see *anything* on the screen. But I want the whole audience to think that they've seen everything." Terrific! Now how the hell do you do that?

So that was our problem. And that in itself dictates the look of a picture; that in itself will tell you what you can do.

I was at a screening at the Academy the night that GOODBAR came out and there was dead silence. Dead silence all the way until you got down to the foyer on the way out. And there was a little murmur, and people actually attacked me. Friends. They said, "How could you make a film like that?" I said, "What do you mean?" They said, "Well, all the pornography." I said, "There was none." They said, "Are you kidding, I *saw* it." "You didn't see it. There just *is* none."

(Final sequences of LOOKING FOR MR. GOODBAR, directed by Richard Brooks, 1977. A man runs through the streets, parts angrily from his friend, and is seen alone in a bar playing pinball. He becomes vicious when a homosexual speaks to him. He meets Diane Keaton and goes to her apartment

where a sexual scene turns into a murder.)

In the last sequence, we had all the strobe lights in sync and we shot a test. Then we took all the cables off the strobe lights and used them out of sync. And we found that we liked the strobe lights working out of sync because we found in the daily that the variance in the duration of white and black helped in the cutting. You could cut to a lighted piece of film and go black, and then add more black to lengthen the time between the lights going on and off. Or you could subtract black. Or once the frame went white you could make it last longer. You had more control over what was happening on the screen, and the audience felt it was the strobe.

We also used the old easy system of a key light, a fill light, and a back light, and that was the main lighting source. We had a ambient overall so that it didn't go completely black, 100% black, and that was about two foot candles, I think. This whole sequence was shot at 4½ foot candles, and we printed at 25 in the middle of the scale. It worked out well.

Richard had said, "Billy, nobody sees the film." And he has the power in his contract: once he starts to shoot, nobody sees a frame of film until he has finished cutting the film and dubbed it and hands them a release print. And then they say, "Okay." And they have what they have. And that's not a bad having.

And he said, "Billy, let's try everything we want to try. Anything you want to try. And don't worry about it because nobody's going to see it but you and I. And if it doesn't work, we'll just do it over." I said, "Thank you." I loved him. This man's a genius. Never shoots a master. Rehearses the master, never shoots a master. Takes the original master up to a point, makes a camera move, another cut, takes it to another point, each time moving in closer and closer. His directing is phenomenal.

You know, I envy anybody that can write, because I think writing is the main core of what we're all trying to do. I just wish I could write. And I think if you're a writer you should direct your own material, because you really know that material. You have made that child, you should make it grow up. Richard Brooks is a writer and I respect him deeply. I love him very, very much. Because he's an honest man and he cares about what he's doing. ■

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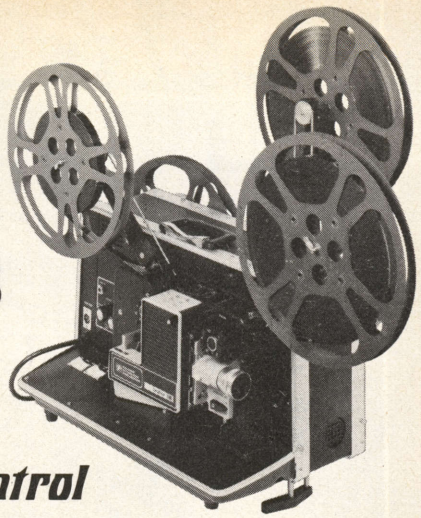

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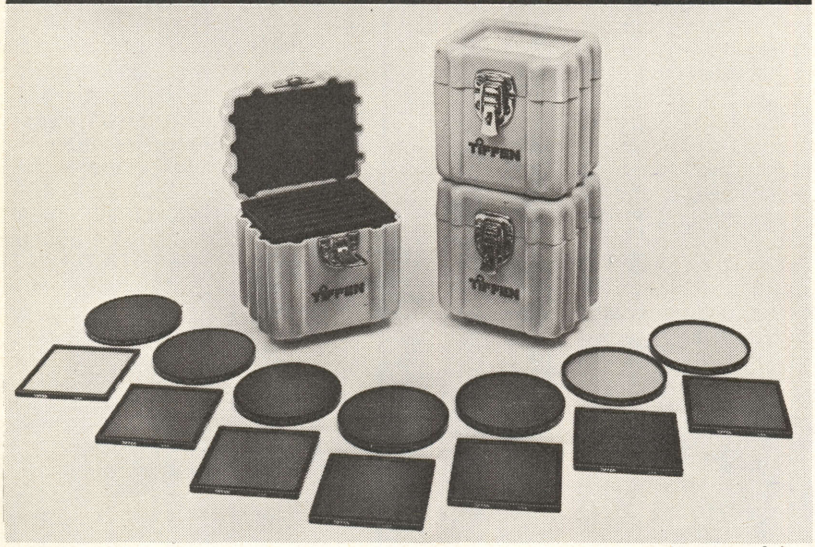

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Continued from Page 887

that improved the shot. As John puts it, "playback made everyone aware of the effect of their contribution on the whole shot." Certainly the availability of playback and the immediacy of a floor monitor allowed John and the entire crew to make improvements they may have missed without it in film.

One thing that caught John by surprise was the lack of flicker in the eyepiece. With the mirrored shutter in a film camera, the operator sees no image 24 times a second as the shutter closes between exposures. In the Panacam as in any video camera, the image is the same whether tape is rolling or not.

The simplest way for the operator to determine whether tape is rolling if he has his eye to the optical finder is via the communications system built into the camera cable. Headphones plugged into the side of the camera can be connected to any sort of communication system by means of the outlet on the control unit. It is possible to have a separate communications system for the camera crew or to plug into a larger production communication system through the video truck.

Other features of the Panacam that proved invaluable were the interchangeable lenses. The Panacam incorporates a package of optics behind the lens that interfaces the 35mm format lens to the ⅔" format of the Saticon video tubes. It also incorporates an iris so the lens is mounted at full aperture and the t/stop is set internally and is displayed on an LCD on the side of the camera. It's a valuable system which also picks up 2 stops of exposure. But the real value of these optics is to let the director of photography select any of Panavision's lenses.

In addition to the wider lenses for comedy, for another scene we needed to hide the camera in a park and use the 500mm telephoto lens for some candid camera responses to our comedian asking ladies leading questions. But trying to hide with a grip truck, video truck, dressing rooms, cast and crew was a little difficult until one of the grips made a valuable suggestion. We put the camera complete with operator, assistant and dolly in the grip truck and shot out of the open side door. It was flawless. We looked like we were packing to leave so all the crowd's interest in the

camera subsided. Our actor was able to roam over much of the park and John never lost him. Richard was able to watch the monitor and sent runners with directions to the actor like a coach sending in plays from the sidelines. The ability to change lenses to suit the scene as in film let us capture some very natural, very "candid" responses.

In discussing the Panacam with John, he agreed that he was able to approach the whole project exactly as he would had we been shooting film, from the hand-held work through the Panahead and dolly work he "did the same things as I would with film."

As for the lighting I was using reflector boards and a 12′ x 12′ Griflon to bounce light and HMIs to add light to my exteriors. During our actor's walk through the house we actually had to shoot after the sun had set so I used HMIs through the windows and let the interior hallways fall a little dark. We were working with 150 foot candles coming through the windows that highlighted the 75 f.c. or so that filled his face in the dark moments. That and our 17mm T1.9 lens would have given me the same look in film. On the stage I used soft front light and stronger back light with conventional studio lighting instruments. I did find that I liked the image better working with a key in the neighborhood of 200 f.c. as this gave the Panacam a stronger image with less noise in the blacks. It is still early in the marriage of videotape and film but the Panacam system is being constantly improved to bring the parameters of tape and film closer together.

Once the image passes the mechanics and optics of the Panacam, it comes to the three Saticon, or if you prefer three Plumbicon, video tubes. With film, the exposed negative would go to the lab, be developed, timed and printed for our viewing the next day. Eventually the negative would be transferred to videotape. With the immediacy of videotape as Keith puts it, "the video engineer is like the color timer." He becomes the lab on the set. In fact, the video engineer is in constant control of more parameters than the density and color balance of the image. There are analogies to film for most of the parameters in videotape that a director of photography can ask his video engineer to manipulate to shape the proper mood and feeling of any shot. The highlights can be manipulated by compressing the whites or adjusting the point at which the detail in the whites is "clipped," or designated as too bright for the sensitivity of the camera and recorded as white. If too much detail is clipped on the set it cannot be recovered later, however, it is possible to clip more highlight detail in post. Similarly, the black pedestal can be adjusted to clip more or less detail in to black but once detail has been clipped, it too cannot be recovered in post. These are both very noticeable parameters. Their adjustment has all to do with the balance of lighting in a scene, if you wish to clip less detail in a highlight you must add light to the dark areas, as you must to avoid losing detail in those dark areas. However, if a cloud suddenly softens the light, it is possible to compress the blacks or lower the black pedestal and create darker shadowed areas to approach a match of the bright sun. These are roughly similar to printing film up or down to the taste of the director of photography, but the effect is seen immediately and therefore can be more conveniently adjusted as it's being recorded.

There are two subtler manipulations, the black stretch and gamma, that are like pushing and flashing film. Increasing the black stretch is like adding electronic fill light, or like pushing film. It amplifies low light areas but increases noise as it does. We used as much black stretch as we could to help our runaway housewives at the station wagon against the white sky, but I still had to add a softened 1200 watt HMI through the windows to achieve the balance I desired.

Changing the gamma is similar to the black stretch but it changes the characteristic of the camera between the lows and the peaks of the video signal. A lower gamma gives a more contrasty image. It compresses the blacks and makes the colors more saturated. Conversely an increase in gamma results in a lower contrast image, with more detail in the black and in the white areas and the colors become less saturate. This effect is roughly equal to flashing in film but again it is at your fingertips in video. You can look at the effect and extent of the change without committing to it before you see it as you would have to in film. You can also evaluate the interaction between the black stretch, gamma and other parameters as they are adjusted. In a few film to tape transfer houses, however, the negative can be more subtly adjusted and computerized to control any of these

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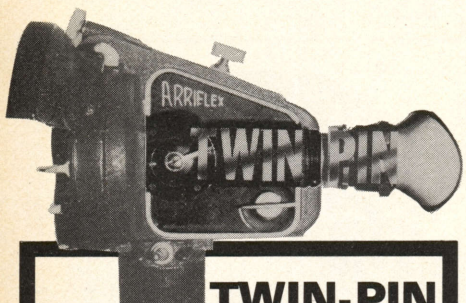

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subtle changes over any length of film.

In order to take full advantage of the manipulations of these parameters, the Panacam has a camera control unit which was in Compact Video's truck along with a wave form monitor, vector scope and color monitor. In videotape there is a great deal of discussion over which color monitor to believe. Keith's philosophy on this, I think, is very correct. The color monitor in the truck is one of three calibrated cross-checking tools. The waveform monitor which displays a graph of the video signal, and the vectorscope which indicates the colors in the signal are both very accurate. The color monitor is a third tool for the video engineer which is aligned easily but then is calibrated to the engineer's eye and his memory of the basic flesh tones. As two timers might print slightly different flesh tones, so also color monitors vary slightly from engineer to engineer. It then is used to cross-check the waveform and vectorscope to nail down all the parameters of the video signal. We kept all light and reflections off the screen of the color monitor. Keith could adjust the signal with the camera control unit and accurately monitor the effect of any change on the waveform, vectorscope and finally on the color monitor. Under the best conditions in the truck this was easy as it was when we added a second camera and camera control unit and color monitor. We needed the spontaneous reactions of THE FACTS' host in his computer command center as he interviewed two very funny cosmonauts who were supposed to be circling the earth for months. To play the humor of the spaceship we put up the extremely wide 14mm lens, but Panavision has improved that lens so much that there was no distortion at all. So John suggested Panavision's original 16mm T2.8 lens that was designed to exaggerate perspective. It gave us the distortion we wanted so we used it. For Keith to balance this very funny lens with the other camera's much clearer 20/100mm zoom was easy with the camera control units and monitoring tools in the truck. We added as much enhancement (an electronic sharpening of the edges in the picture) as we could to the cosmonauts' camera without adding too much. More enhancement could be added in post, but it couldn't be reduced. So the shots cut together well because they were intended to look very different.

Only once were we forced to use only the color monitor outside the truck to evaluate a scene. Once our "runaway housewives" got packed in their station wagon we wanted to follow their dialogue as they drove. A second, matched, station wagon was hooked up to be towed by the camera car and the mount was readied on the hood for lights and camera. On a four day shoot every move was critical and this saved us a half-hour. I added a Mighty Mole each for the actresses, powered by the camera car's 120 volt battery, and used a polascreen to reduce the reflections from the windshield, exactly as I would have with film. We took no waveform or vectorscope, but we did take a small color monitor and a lot of confidence. There was no way to block the light for Keith and I to watch the whole shot. After we used it to adjust the polascreen and set the iris, the small monitor was brightened and turned over to Richard to evaluate the acting. We presented quite a sight, all of us riding the camera car pulling a station wagon up and down Ventura Boulevard straining to find comedy on a 5″ color monitor. In the final tape the effect is successful, it feels like the ladies are on the road, not on a stage with process shots.

So the color monitor was adequate for that scene. But when we were working on the stage the monitor on the floor was not meant to be used to evaluate the quality of the image, only the content. It helped everyone see what was in the shots and the acting, but all the lighting and subtle manipulations of the image could only be evaluated on the color monitor in the truck.

You still cannot buy a Panacam because, like the Panaflex, the company wants to rent only the latest improved model of their equipment. Just since I used the camera, they've made many improvements that we could appreciate. They've designed a vastly improved "soft white clip" circuit to handle much brighter highlights. Panavision claims the new Panacam can handle highlights that are as much as five stops brighter than the exposure setting.

And Panavision has increased the flexibility of their enhancement circuits in the blacks and in the highlights. They have added "in and out of band detailing" circuits which give greater enhancement of the blacks and more adjustable enhancement of

the highlights. These improvements are both switchable to let the engineer and director of photography adjust the amount of each effect they desire.

There are so many differences in shooting tape versus film that it can be intimidating. But there are enough similarities to make it an easy transition. Just as film emulsion responds to light, videotape responds to magnetic patterns. Just as you might push a film stock to achieve an effect, you might adjust the black pedestal or the white clip. Or as you might flash a filmstock, you could adjust the gamma or black stretch to lower the contrast. And if you felt you wanted to use a 35mm lens to capture an image on film, with the Panacam you could use the same 35mm lens as well as the same operator, assistant and Panahead to maintain whatever "look" pleased you in film.

For the whole show I wanted to get an image that was of the best possible videotape quality. I wanted to get it as quickly and as gracefully as possible. I wanted to offer that image to the director, Richard, so that he could devote most of his time and efforts to the actors and their performance. Toward that end I had to make some careful selections of both equipment and personnel for the shoot.

Many of my decisions were based on experience I'd gained shooting TV commercials both on videotape and film. The demands of shooting TV commercials are different from the demands of TV pilots, but much of the information is transferable. In every commercial there is always one unique idea or concept. You work all day to capture that one unique item, and you work until that item is perfect. You are forced to spend a great deal of prep time and shoot time exploring or creating that very important detail. It is a very instructive background. If it is getting a uniquely bright smile from an actress, if it's getting steam to rise from the baked potato, or if it is getting smoother undulations from the perfect creamy folds of Detroit's sheet metal, there is one essential item that is the core of every day's work.

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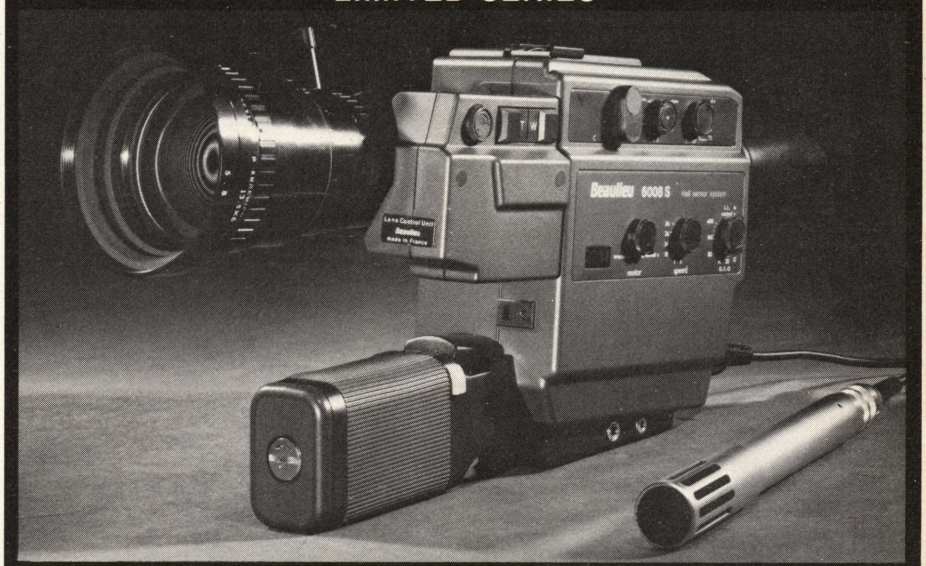

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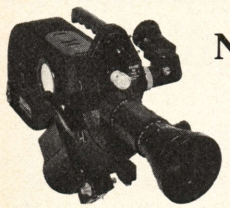
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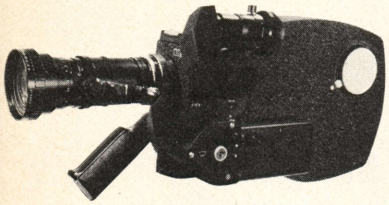

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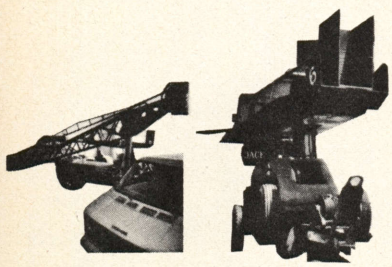

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lighting, but also the recording of the image. The state of the art at the moment, sadly, is that the technology, many times, surpasses the technicians. There are many people operating the video technology who are brilliant, but unfortunately there are also a number of people who are enjoying a modern day video carpetbagging. There are many video trucks for hire, complete with camera and engineer. And they are very capable of matching standard broadcast levels, but lack the flexibility and the finesse that is often demanded by commercial production. This has led to some very uncomfortable surprises in post production when someone says, "That doesn't look at all like the picture we recorded." The goal we all strive toward is to have an image laid down on the set that pleases everybody, to have that same image reappear in editorial, and subsequently to deliver that image to the audience at home.

Even though we were shooting THE FACTS on location and subjecting the camera to extreme conditions, the adjustment to shooting this pilot on videotape was a reasonable one.

Making an adjustment to a new media is relatively simple, but making an image look good will always be a creative challenge. Capturing the proper mood, feeling, sense and style with images is always going to require the same talent. If you have a certain look that works for you in film, and you are shooting for a television audience, there is no reason you cannot recreate that look in videotape, especially with the new Panacam. ■

Sundance
Continued from Page 893

with script consultants for a series of discussions about their scripts during the first part of the year. While they are at Sundance the filmmakers continue to work on their scripts and spend one week of their time there rehearsing, taping and editing two selected scenes from the script. The rest of the time is spent in sessions with "resource people" discussing production design, production management, distribution, financing, etc. There are also two or three screenings of films each day, generally followed by discussions with someone involved in the production of the film.

The Sundance Institute is only in its second year of existence, and everyone involved is quick to admit that it is still evolving into what it hopes to be. It is not yet in a position to contribute directly towards the financing of the projects developed under its auspices, and there are still problems in organizing the best possible program for each filmmaker. Nonetheless it is a unique institution with a great deal to offer the right filmmakers. The biggest problem it faces now is that of matching its resources to the needs and expectations of the participating filmmaker.

Probably the most valuable asset which Sundance has to offer is a very intangible thing, and that is the atmosphere which surrounds the work being done. There is a kind of intensity and excitement and idealism that is hard to come by when one is trying to get an independent feature off the ground. There also appears to be a genuinely supportive attitude among the staff and the resource people who are working with the filmmakers. Setting the tone for this is the keystone around which the entire program is built—Frank Daniel. Daniel is an extraordinary man with a passionate love for the art of filmmaking and a rare ability to develop a writer or director's innate sensibility. He can understand filmmakers on their own terms and comment on what they are striving for rather than suggesting to them that they ought to be trying to do something different.

Probably the next most valuable aspect of the Sundance experience is the chance to work on a scene with the likes of Karl Malden or Robert Duvall. Not all of the actors involved with Sundance as resource people are of this caliber, and many of them will say that the chance to act in a scene with some of the other actors there is what makes their own participation worthwhile. Also, not all of the filmmakers have material that is suited to the best actors who are available, but there is an effort to bring in actors who can be reasonably cast in the scenes which the filmmakers will be rehearsing. One of the filmmakers who had already cast the lead roles in her film was able to bring her own actors to Sundance.

The resource personnel who contribute their time to Sundance spend anywhere from a few days to the

entire month at the institute. They make accessible to the filmmakers a wide range of experience, and they also form a network of contacts within the industry that the filmmakers can call on after they have spent the month in Utah and have returned to the real world of trying to get a movie off the ground. For some of the filmmakers Sundance represents an initiation into the closed circle of the movie business. Having been chosen by Sundance gives them and their project a degree of validity that they might not have had previously in the eyes of Hollywood.

It is difficult to evaluate the success of Sundance. None of the projects selected for the program during its first two years has actually gone into production yet. Most of the filmmakers seem to feel that the experience has been a valuable one and that the contacts developed as a result of their involvement are helpful, but it remains to be seen whether Sundance can realize its goals.

A PERSONAL PERSPECTIVE

When I spent three days at Sundance this summer, I was doing more than observing as the editor of AMERICAN CINEMATOGRAPHER. Prior to joining the magazine last November I had submitted a project to Sundance which was eventually selected for the 1982 program. I did not participate in the program basically because I had made a commitment to become editor of the magazine and because I did not feel that I was close enough to securing financing for my film. Needless to say I was interested to see what I was missing out on.

I had worked with Frank Daniel at the AFI Center for Advanced Film Studies, so I knew something of what the program would probably entail; but I was somewhat skeptical about other aspects of it for a variety of reasons. I had one script conference with Irvin Kershner even though I knew I was not going to be able to participate in the June program, and I had had three or four conversations with other representatives of Sundance, but I did not really have a clear idea of what a filmmaker could reasonably expect to gain from participation in the program. What I did have was a sense of the potential pitfalls for an operation like Sundance, and I was curious to see whether they had been avoided.

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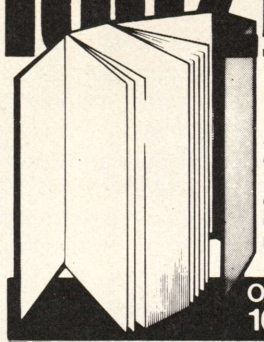

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The first is essentially a matter of taking independent talent and playing on insecurities until a sense of dependence sets in. For my own personal reasons I tend to be a bit suspicious of someone who sets out to help an independent filmmaker by first trying to persuade him that he doesn't know what he is doing. This generally takes the form of "the script needs work." I am told that all of the filmmakers who participated in the first Sundance program arrived in Utah perfectly convinced that their scripts were ready to shoot and departed with the understanding that their scripts needed work. When Robert Redford is quoted in the brochure as saying, "I would like to see the quality of independent film, in general, improve;" I hear someone saying that the problem is not that financing is unavailable for independent films but that independent films aren't good enough and need to be helped by the "professionals" who are making the films that most would-be independent filmmakers are reacting against.

So far as I could tell, however, the atmosphere was very healthy in this regard. Frank Daniel is the one who sets the tone for most of the script discussions and most of the filmmakers are able to perceive the discussions in terms of suggestions for options to explore rather than prescriptions about the rules of "good" writing. Daniel even expressed dismay about one filmmaker who he felt was unduly influenced by the comments of a distributor who had read the script with an eye to its commercial appeal rather than the integrity of the story.

It should be noted of course that this summer's crop of filmmakers arrived already persuaded that their scripts needed work, and it is clear that Daniel's ability to work with writers attempting to rewrite or polish their scripts is probably the strongest feature of Sundance as it now operates. When I questioned Sterling Van-Wagenen, executive director of Sundance, about what Sundance might have to offer someone who had a script that truly was ready to shoot, he indicated that they would love to have the opportunity to work with such a project. Other conversations gave me the impression that Sundance could indeed be valuable for a project that did not need script revisions.

The second pitfall that I suspected might threaten Sundance was that of exaggerated expectations on the part of the filmmakers. Sundance espouses pretty lofty ambitions, and it is very easy for a struggling independent filmmaker to look to a place like Sundance as the answer to all his problems. After all, Robert Redford has marshalled the "hippest" element of Hollywood to enable independent films to get made. If you have been selected from the scores of projects submitted, then surely you are on your way. Unfortunately this may not be the case. Someone who came expecting a one way ticket to Hollywood could go home feeling that Sundance was just a summer film camp from which he couldn't even bring home a videotape to show his folks.

A certain amount of tension between expectations and realities is probably inevitable at Sundance. Even if a filmmaker "understands" the limitations of Sundance, he is probably still hoping deep down that some magic is going to happen which will result in financing for his film. Sundance administrators are trying to minimize this frustration by selecting projects and filmmakers that they feel are most suited for the program and by working with the filmmakers as much as possible before they arrive in Utah in June. It is probably safe to say that more progress can be made in this area, but on the whole my impression was that the level of frustration or cynicism was remarkably low among the filmmakers there this summer. If anything, there was probably more frustration among the resource personnel—particularly some of the actors—who felt they were not being made use of as much as might be possible.

The biggest question is probably whether there is life after Sundance. Filmmakers come to Utah, spend a very intense month working on the development of a project and then return to that limbo known as "raising production financing." A fair amount of time at Sundance is devoted to seminars and discussions about financing which may provide guidance, but the difference between the idealism of Sundance and the commercial considerations of potential financiers might well make Sundance seem like an academic exercise. Again, the administrators of Sundance are aware of this, and they are planning to create a co-production fund in the future.

One question which inevitably arises is, "If Robert Redford wants to

foster low budget independent filmmaking, why doesn't he just finance a couple films each year.'' This of course assumes that Redford has the money to invest. It is not necessarily meant to question the sincerity of Redford's motivation in founding the Sundance Institute so much as it is an expression of a difference in priorities. The implication is that it would be better for one film to get made than for eight films to be developed and left to their own devices.

The official response to such a question is a complex one. First of all there is the belief that the institute needs a broad base of support to insure its health as well as its survival. Only if it is not dependent upon one source of financing can it remain as independent and as idealistic as it is intended to be. Redford currently contributes the facilities to house the institute and a great deal of his time and energy go into the fund raising efforts. The funding for the program itself, however, is provided by contributions from a variety of individuals, corporations and foundations.

Secondly, Sundance is set up as an educational institution. Its primary goal is to nurture talent by means of the kind of program it has established. Actually supporting the production of the films is another aspect of its goals which obviously requires more money, so it is reasonable to begin with the development program. It is hoped that the impact of the money available can be greatly enhanced by developing several projects to a point where they can secure financing elsewhere.

My own conclusion was that Sundance could be an extremely valuable experience. I can imagine devising a program for my own script which would have three phases. First I would spend a week rehearsing two or three principal cast members and videotaping as much as I thought would be valuable. I might try to lobby for multiple camera taping of rehearsals rather than doing the kind of single camera breakdown of the scenes which the filmmakers were doing this year. I am also assuming that Sundance and I could get the actual cast members I would want to use in the production to come to Utah for a week of rehearsals. The second phase would be devoted to the evaluation of a detailed shot list for the entire script and possibly to storyboarding the film if Sundance could enlist the aid of a storyboard artist.

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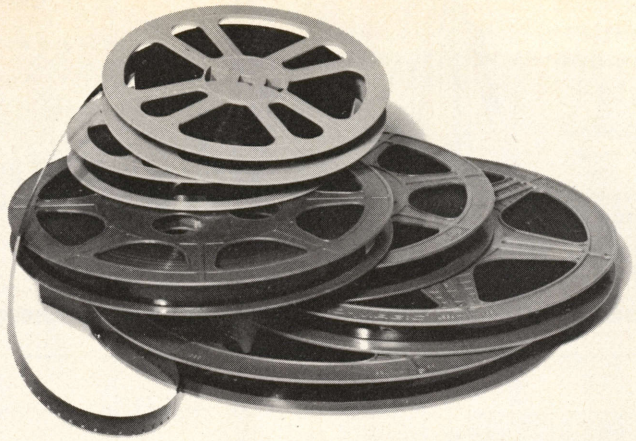

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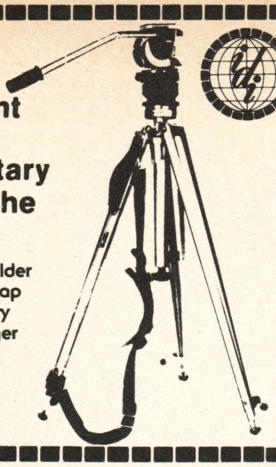

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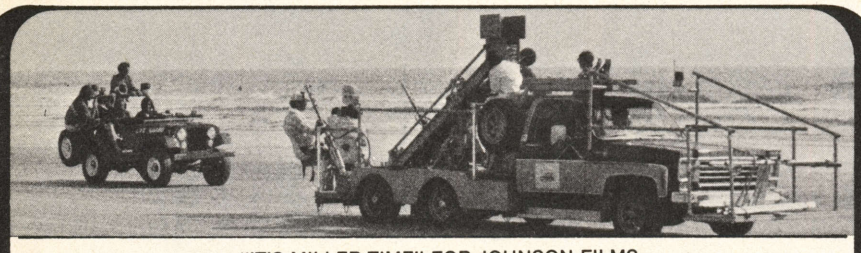

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This phase would be done with the assistance of Frank Daniel, a cameraman and perhaps a production designer. The third phase would be devoted to logistics with the aid of a production designer and a production manager. I would schedule the entire production and complete a revised budget based on the schedule and the work with the production designer. In other words as I see it the real potential of the Sundance Institute lies in making available to a low budget film the kind of pre-production planning that it could never afford otherwise. I would expect to go to Utah with a complete shot list, shooting schedule, and budget which I would rework with the help of people who had already read the script before coming. With proper scheduling and a little luck, I can imagine a month of very hard work which could make a great deal of difference in the production of the film.

Filmmakers desiring further information about the Sundance Institute should contact Sundance Institute, 19 Exchange Place, Salt Lake City, Utah 84111. ■

GUNGA DIN

Continued from Page 899

spray gun and painted six extras at a time on a wooden turntable.

Four elephants (led by Annie Mae, a famous trained pachyderm which performed in hundreds of movies), several truckloads of camels and bullocks, and nearly 400 horses also were used in the battle sequence.

It was found that the off-white costumes of the Hindus, which photographed perfectly in the Hollywood exteriors and interiors, photographed badly at Lone Pine, which is nearly 4,000 feet higher than Los Angeles. The wardrobe men bought all the available flat white goods—more than 300 yards of it—from the three stores in Lone Pine and confiscated 72 bedsheets from the location camp in order to make new costumes in a hurry for the 400-man Thuggee army.

The director of photography was Joseph August, ASC, a veteran cinematographer who began shooting Westerns at Inceville in 1911. August was William S. Hart's favorite cinematographer—he shot 59 of Hart's hard-bitten, realistic silent films. He also was an early visual effects man,

specializing in miniature work, multiple exposures and matte shots. His most embarrassing moment occurred when he staged a dramatic scene of a sinking (miniature) ship in an outdoor tank at Inceville. At the screening he was horrified to see a gigantic cow amble into the background and take a drink from the distant edge of the "ocean."

August's work ranged from the austerity of the Hart Westerns to the rich atmospheric work in John Ford's production THE INFORMER (1935), William Dieterle's ALL THAT MONEY CAN BUY (THE DEVIL AND DANIEL WEBSTER) (1941) and the delicate PORTRAIT OF JENNIE (1948), his last picture.

August was a true stylist whose work often was unconventional. In an AMERICAN CINEMATOGRAPHER interview (March, 1939), he mentioned his aversion to using exposure meters:

"I am not against meters, by any means. They just don't fit into my plan of taking pictures. The meters I lean on are my eyes. When I first started in this business 28 years ago I had a preceptor I then thought sort of tough: tough because he was insistent upon my learning what could be accomplished with a pair of eyes and a man with scant patience for any devices that aimed to make those organs secondary to any human invention.

"Then again, frequently I choose to make an exposure that—well, we will call it an unorthodox exposure, one aimed to produce a certain effect that may be desirable. For instance, the negative might be overexposed and underdeveloped—or the procedure might be reversed . . . It would be necessary to tip the laboratory if it so happened the lab were one in which a cameraman could take what some might consider liberties these days.

"I recall that same preceptor of mine down at Inceville in the beginning. There was a device at that time designed to obtain for the cameraman something parallel to what a meter would provide today. I was told with considerable detail and even more emphasis just what fate would befall me if he ever found me fussing with one of those gadgets . . . known as the illumination system.

"It was just after that interview I began seriously to cultivate attention to my eyes with the object of learning as much as possible of what I could accumulate in the way of optical knowledge."

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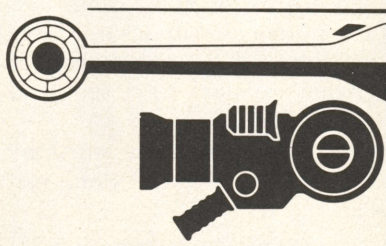

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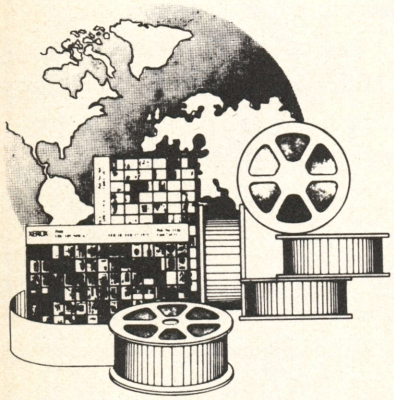

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hard highlights and deep shadows of the Alabama Range gave August's educated eyes a heavy workout. He enumerated some of the location problems in a statement to a 1939 issue of William Lewin's Group Discussion Guide magazine:

"The wild assortment of weather during our ten weeks on location in the Sierras gave the camera crews the most trouble. Because of the heavy expense of maintaining a large company so far from Hollywood it wasn't feasible to shoot the story in sequence. And it was our problem to reconcile the photography to keep the weather cinematically consistent.

"Here are a few weather notes on what we experienced during our work at the GUNGA DIN location:

"Temperatures which for weeks ranged from 105 to 115 degrees, beneath cloudless, empty skies.

"A pre-season snowstorm that swooped down from nearby Mt. Whitney, skirted our sets, changed our majestic background of rugged peaks to solid white. (While subsequent warm weather brought the background back to normal we confined ourselves to closeups).

"A freak windstorm which damaged some of the sets, and actually took the roof off a nearby mountain cabin.

"Dust storms which lasted three days, obscuring all but the closest objects. (Again we stuck to closeups till the weather cleared).

"Several rain storms, preceded by some of the most beautiful cloud formations I've ever seen."

That damaging windstorm set a 35-foot camera tower to rocking while four of the camera crew hung on desperately. The guy wires snapped, but before the tower could topple some 40 men surrounded it, grabbed the wires and clustered around the base of the tower, holding it in check until the men were able to climb down.

One of the more unusual examples of photography occurs when two of the soldiers enter the secret valley and behold the Thuggee temple. The camera frames a closeup of one actor's right profile, then pans right to reveal details of the valley and temple in a slow, 180 degree sweep that ends on the left profile of the other actor. It provides a long moment of eerie atmosphere at once desolate and yet teeming with unseen menace.

Similarly weird are the night scenes of a torchlit procession of hundreds of Thuggees over the desert and into the secret shrine. The sequence begins at

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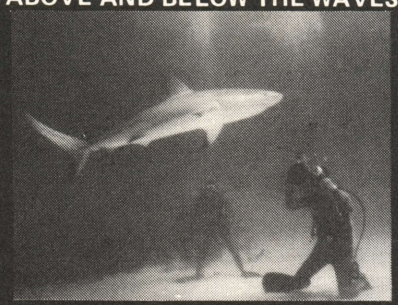

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the Lone Pine location and proceeds smoothly into the sound stage interior set. Other dramatic scenes follow, lighted (to all appearances) by the flickering torches of the worshippers who crowd the big set to hear Eduardo Ciannelli exhort his fanatics to "Kill lest you be killed yourselves; kill for the love of Kali; kill for the love of killing; kill, kill, kill!"

Heading a second photographic unit in the large-scale action was Frank Redman, ASC, who had been second cameraman on 10 Pathe serials before becoming a director of photography at RKO. Other cameramen at the location were operators Charles Burke, William Clothier, Eddie Pyle and George Diskant, and assistants Charles Straumer, Joseph August Jr., William Reinhold and Ledge Haddow.

Pandro Berman, alarmed at the rapidly mounting costs as the location work extended well beyond the original six weeks schedule, ordered the company to return to Hollywood before the outdoor action was completed. Many of the remaining scenes were then shot at locations closer to the studio, such as Bronson Canyon (where a village street was erected), the RKO Ranch at Encino, and Lake Sherwood (which stood in for the river at the edge of the village). For the scene in which Din and the three sergeants jump from a roof atop a high cliff into the "river," it was necessary to erect a high parallel surmounted by catapults so the full-scale dummies would seem to jump rather than fall.

The interior scenes at the cantonment and in the temple were shot at this time on various stages at RKO's Hollywood studio and RKO-Pathe in Culver City. In September, a rough cut was assembled and shown to the studio executives. Only the climactic battle and some post-production work remained to be done. So impressed were the officials that they decided to authorize another two weeks of shooting at Lone Pine to permit the battle to be filmed on an even larger scale than was envisioned originally. The decision was made despite the fact that the final production cost would almost certainly be more than could be recouped at the boxoffice.

The returning company was greeted by an early snowstorm and seasonal rains. The battle scenes were staged spectacularly enough to rank with the best of DeMille and Griffith. Cameras covered the action from numerous angles, capturing both the vastness of the sequence and its intimacy of minutely

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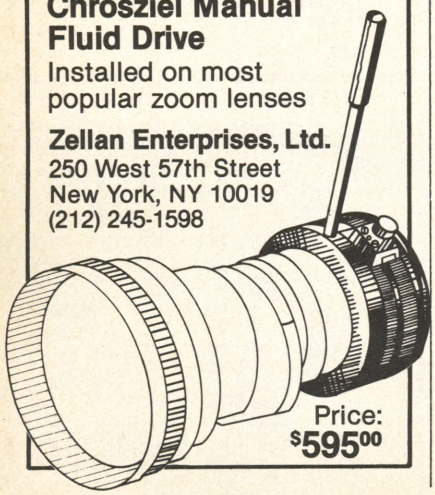

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choreographed detail.

Producer-director Stevens said that "From a director's standpoint, the battle scenes constituted our biggest problem.

"The job was to use 1,500 men, several hundred horses and mules—to say nothing of four elephants—most effectively for scenes of utmost confusion, and still plan the action to obviate accidents and possible injuries.

"To do this we first fought on paper the entire battle, the charge, and the headlong retreat of the Thugs. Then we transferred our activities to Mt. Whitney's rugged slopes, and rehearsed the cast in small detachments and in 'slow motion' until the mechanics of the action were established. As the scene took shape the number of people and animals was gradually increased, the action speeded up until we had the scene going at top speed—then we shot it.

"Just beyond the range of the cameras were posted first-aid facilities as well as wranglers to recapture frightened, riderless animals. Behind various rocks assistant directors kept in touch with me by field telephone, and relayed my 'commands' to the groups nearest them."

Among the horsemen involved in the fighting were a number of men who were stars of Westerns in the silent era: Buz Barton, Bob Reeves, Bob Sherwood, Tom Forman and Art Mix. About 30 stuntmen participated in these and other scenes, including David Sharpe, "The Flying Mazzettis" (Vic, Tom and Otto), Max Rose, Rube Schaeffer, Buddy Mason, Bill Lally, Clem Fuller and Walt Robbins. Slim Hightower doubled Sam Jaffe in his heroic climb to the top of the temple and his subsequent fall.

Principal photography was completed on October 15, 1938, after 104 working days, of which 10 weeks were at the Lone Pine locations. The negative cost was $1,909,669.28—about a half-million over the budget. Henry Berman tackled the enormous editing job, cutting most of the picture. Stevens brought in one of his old Hal Roach cutters, John Lockert, to edit the battle scenes into a cohesive sequence. Vernon Walker, ASC, took charge of special photographic effects.

Negotiations were begun to borrow Erich Wolfgang Korngold from Warner Bros. to compose an elaborate score. The Viennese composer was considered tops in the profession because of his work in A MIDSUMMER NIGHT'S DREAM (1935), ANTHONY ADVERSE

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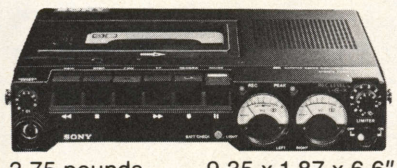

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(1937), and THE ADVENTURES OF ROBIN HOOD. The deal was made, but when Korngold learned he would have only three weeks to compose and record a score with the scope of a symphony, he refused the job.

The dependable Alfred Newman—former musical director for Samuel Goldwyn and other of the United Artists producers, soon to become head of the Twentieth Century-Fox music department—was hired at the last moment. He managed to deliver music that is among the more memorable things about the picture, capturing to perfection the frolicsome overall mood while doing full justice to the romance, suspense and mystery of the picture. Newman conducted a 32-piece orchestra for the recording sessions.

Clifford Stine, ASC, and William Collins photographed the miniatures, matte shots and back projection scenes. Mario Larrinaga executed the matte paintings, which were utilized unobtrusively to add elements to the location settings.

The opening titles, which emphatically convey the expectation of an epic film in store, strongly resemble the later trademark of J. Arthur Rank Productions: a muscular man striking a large gong. In this case the gong is enormous, dwarfing the man with the hammer, who is dressed as a Hindu. Each time the tocsin is struck, a title formed of concentric ripples spreading from the point of impact, shimmers onto its face. Optical photography expert Lin Dunn, ASC, created the effect by reflecting the title letters in a pan of mercury.

Shortly after its premiere, GUNGA DIN was called back for another piece of optical work. Kipling's family had raised objections to the picture's depiction of Kipling being present at the battle scene, where he supposedly was inspired to write his famed poem. The poet was portrayed by Reginald Sheffield, father of Johnny Sheffield of the TARZAN films, and was shown sitting in his tent while Montagu Love read his poem over the body of Din. A wagon was superimposed over the tent, effectively blocking "Kipling" from view. Both versions of the scene exist.

GUNGA DIN proved an immensely popular picture and has been in almost continual release over three decades. It was not popular in India, for obvious reasons, and certainly can not be taken seriously as a true depiction of that country's history. It is only what it set out to be: an exciting, outrageous,

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DIGITAL VIDEO systems DPS-1 TBC, Hitachi FP-40SS ENG/EFP/ Studio camera, Hitachi HR-200/HST 1″ Type C w/ slo-mo, Hitachi SK-91 ENG camera, Panasonic AV 700 editing system, Conrac 7641 Hi-Rez monitor, IKEGAMI TM-142RHA Hi-rez monitor, Ikegami ITC-350 ENG camera, 3M chroma keyer for #6114 SEG, 3M #5130 matrix wipe generator, Jatex USEC-42T editor, Sony VP-3000 ¾″ portable player, Cinema Products 5P001 Camraprompter, Ampex ATR-700-2, 3M #210 color bar/sync generator, Quanta Q-VII character generator. TED or TERRY, (518) 449-7213.

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MAGNASYNC, 2200 rec/rep, 2-602 dubbers, mixer-Selsyn interlock system $3,700. Interlock projector, Magnasync 602 rec/rep $1,150. Canon 12-120 macrolens, Ang. 12-120 $850. Kling time lapse animation system, Maier-Hancock splicer $150. Uher 4000L recorder $750. Arri BL 1200′ mag, cheap. (512) 478-2971.

MCALISTER DOLLY: Good condition. Only $2,500 US. Call (416) 364-8417.

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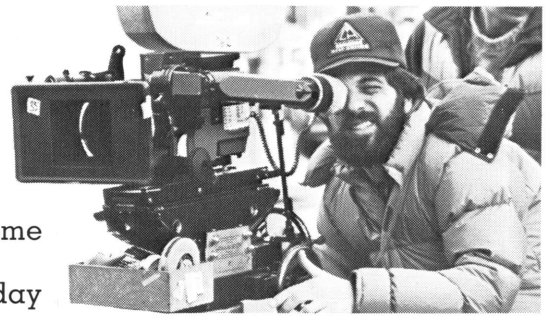
"We did the dailies in New York, post-production in Santa Monica, came back to New York for final prints. It was worth the trip." —*Chuck Braverman, Producer/Director*



West coast producer tells how TVC played a supporting role in "Hit and Run."

"Hit and Run was shot entirely in New York, and that's where it was processed. *At TVC.* I must say that working with TVC was a pleasure. Both Tony Mitchell, director of photography, and I had used TVC in the past and the experience had always been good.

"Hit and Run involved a great deal of night-time shooting. TVC pushed the film one stop without any loss of quality. The results were amazing. So thanks to TVC we were able to shoot in dimly lit places where we would otherwise have had to spend a great deal of time and money on lighting.

"We had only half-a-day to shoot several major sequences set in the New York subway, which is lit with fluorescent lights. In this and similar situations Tony decided to work with available light without any filter, and to let the lab do the color corrections. Once again, the results were remarkable!

"At every stage, we got wonderful cooperation from TVC. Not once did we have a lab problem. In fact, we always felt as if we were TVC's most important customers.

"Post-production was done in Santa Monica, but the film was sent back to TVC in New York for the first trial and answer prints. All in all, it was an excellent experience, and I think that the film shows the dedication that the cast, crew and lab put into it."

Bravo, Braverman!
And bravo, TVC!

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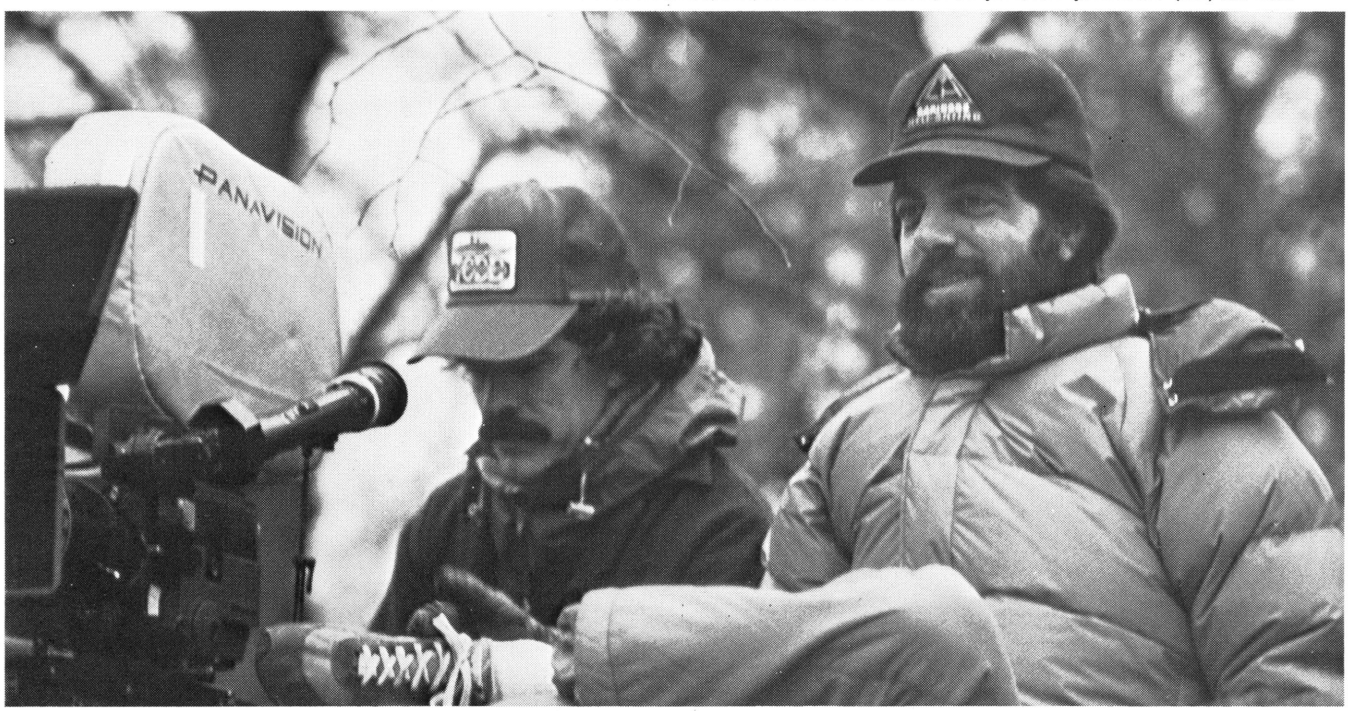

Tony Mitchell and Chuck Braverman setting up a shot for "Hit and Run"

Aäton lets you forget that Nature never forgives.

Guy (rhymes with "oui") Genin, Zellan's principal Service Engineer, shows how the 16mm Aäton LTR outwits a cruel world.

"Ill-mannered Nature can be tamed. When you shoot with a well-designed 16mm camera. I first learned this during bitter Alpine winters at the Aäton factory in Grenoble. The city where I was born.

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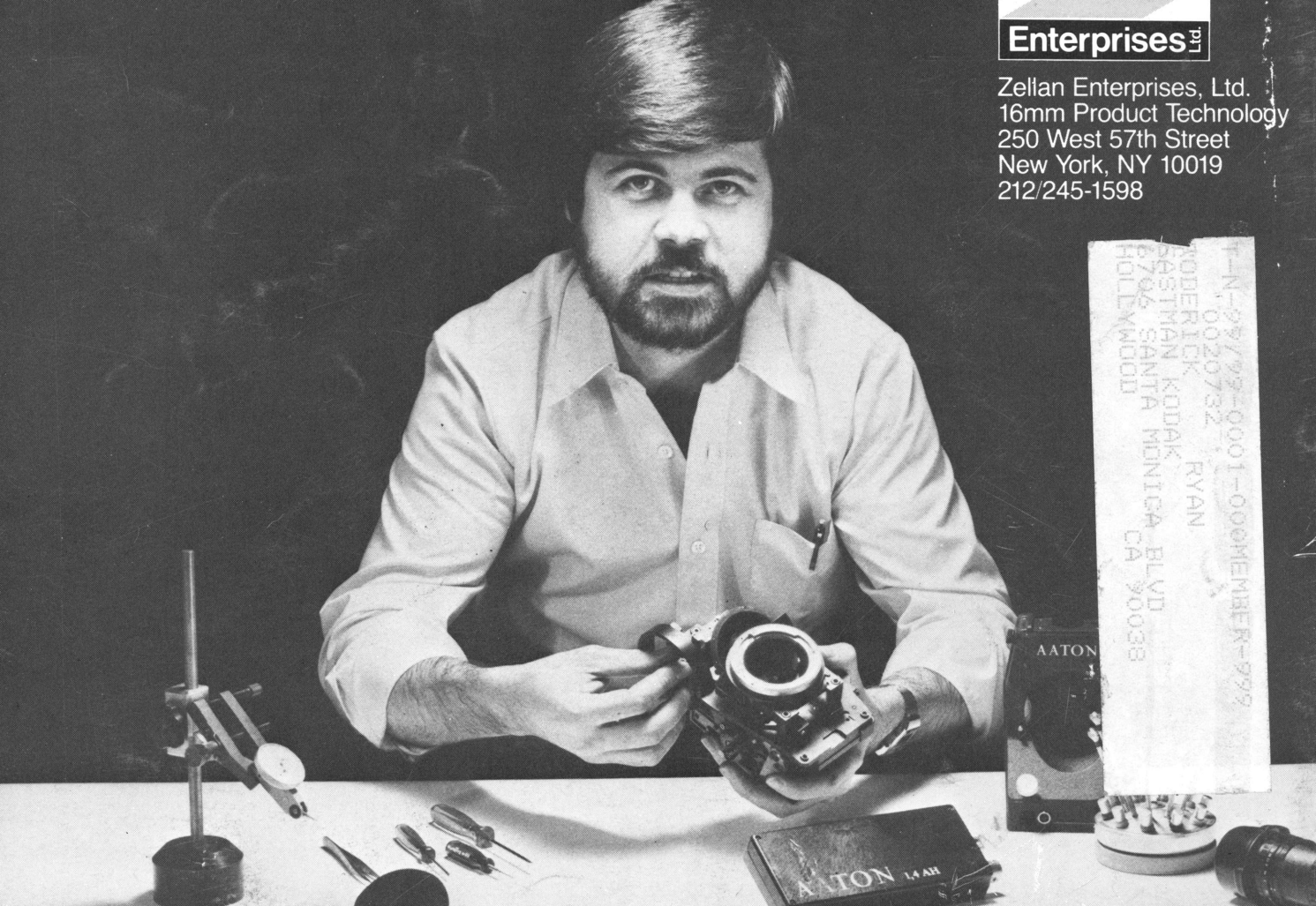
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